

FIG. 3α

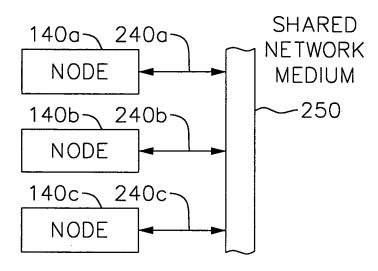


FIG.3b

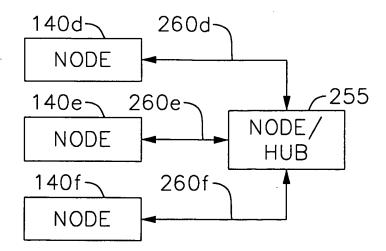
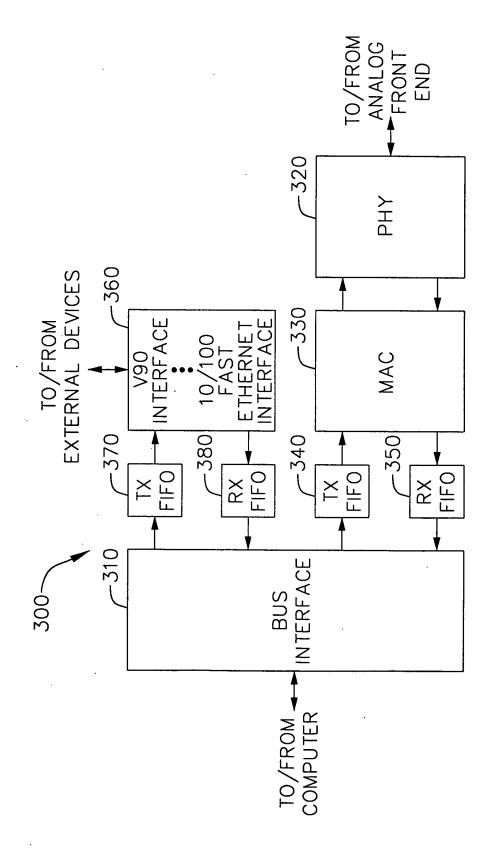
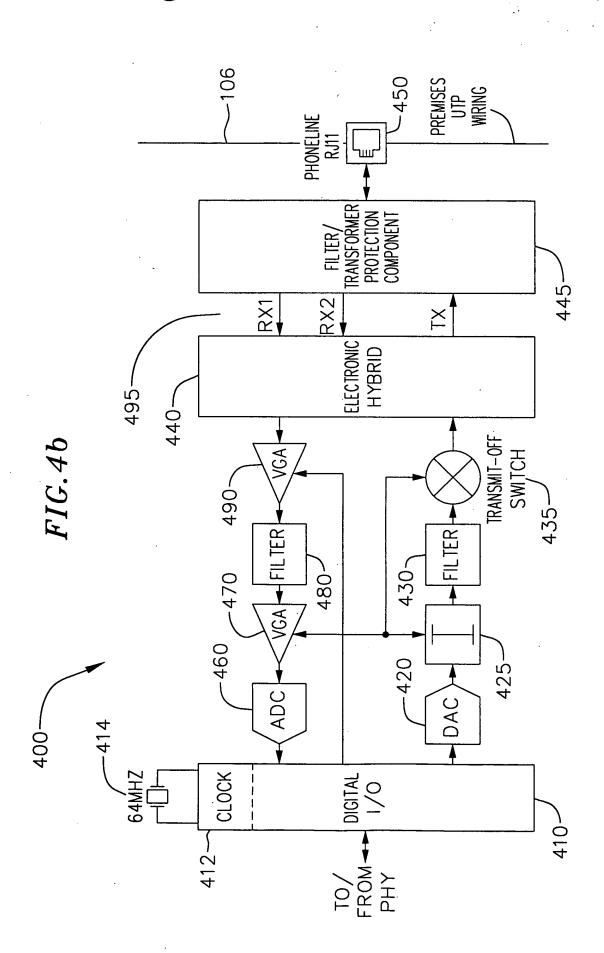
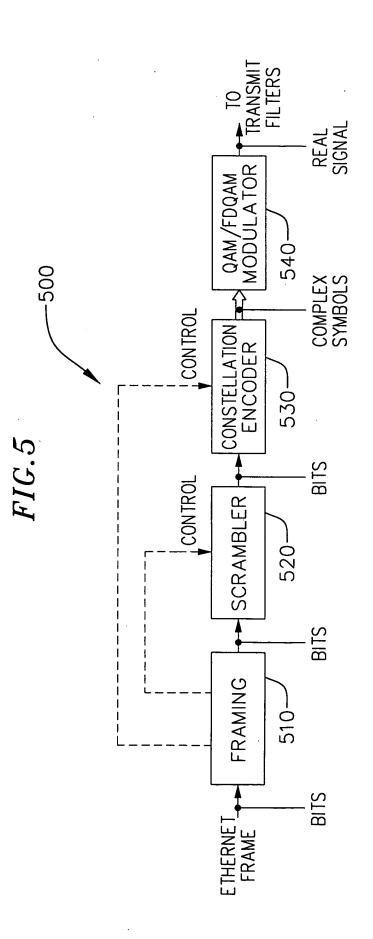


FIG. 4α





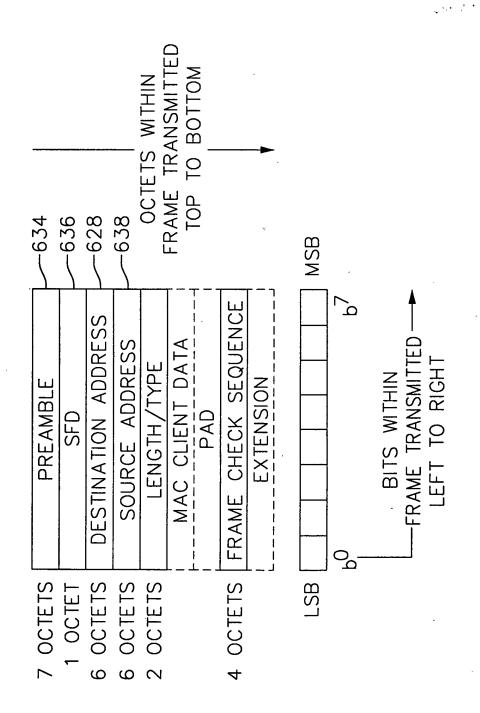


	1 BYTE 7648	EOF	8 A W	TRAILER 2 MBAUD QPSK	·	· , \
	VAR BYTES	PAD	((0
	2 BYTES 644	CRC 16		AUD 630- 32CR,		_626 HCS
	4 BYTES 630	FCS		PAYLOAD RATE BAUD OR 4 MB 8PSK, 16QAM, AM, 128CR, 256		-624
3 —632.	VARIABLE	ETHERNET DATA	VARIABLE	PAYLOAD RATE 2 MBAUD OR 4 MBAUD QPSK, 8PSK, 16QAM, 32CR 64QAM, 128CR, 256QAM	S IRE) 622 6 (PE RSVD
FIG.6ETHERNET PACKET	2 N N N N N N N N N	ETHER- E	S X S S S	620-	FIG.8	-62(
	6 BYTES B	SA ET	24 SYM S	009		SI SI 614
	6 BYTES 628	DA	24 SYM	DER SAUD SK	\ _	FT
-	BYTES	FRAME CTRL	16 SYM	HEADER 2 MBAUD QPSK	'UD ONL'	
	16 BYTES	PREAMBLE 64	64 SYMBOLS	610	. [] = 4 MBAUD ONLY	

FIELD	FIELD BIT NUMBER BITS	BITS	DESCRIPTION
FT	31:24	8	FRAME TYPE. THIS FIELD SHALL BE SET TO ZERO BY THE
			TRANSMITTER. THE RECEIVER SHALL DECODE THIS FIELD AND
		•	DISCARD THE FRAME IF IT'S ANYTHING OTHER THAN ZERO.
RSVD	23	-	RESERVED. THIS FIELD SHALL BE SET TO ZERO BY THE
			TRANSMITTER, AND THE RECEIVER SHALL IGNORE IT.
PRI	22:20	8	PRIORITY (0-7)
SI	19:16	4	SCRAMBLER INITIALIZATION
PE.	15:8	8	PAYLOAD ENCODING
HCS	7:0	8	HEADER CHECK SEQUENCE

VALUE	INTERPRETATION
0	RESERVED ON TRANSMIT, DISCARD FRAME ON RECEIVE
	BAUD RATE=2 MHz, 2 BITS PER BAUD
2	BAUD RATE=2 MHz, 3 BITS PER BAUD
3	BAUD RATE=2 MHz, 4 BITS PER BAUD
4	BAUD RATE=2 MHz, 5 BITS PER BAUD
5	BAUD RATE=2 MHz, 6 BITS PER BAUD
9	BAUD RATE=2 MHz, 7 BITS PER BAUD
7	BAUD RATE=2 MHz, 8 BITS PER BAUD
8	RESERVED ON TRANSMIT, DISCARD FRAME ON RECEIVE
6	BAUD RATE=4 MHz, 2 BITS PER BAUD
10	BAUD RATE=4 MHz, 3 BITS PER BAUD
11	BAUD RATE=4 MHz, 4 BITS PER BAUD
12	BAUD RATE=4 MHz, 5 BITS PER BAUD
13	BAUD RATE=4 MHz, 6 BITS PER BAUD
14	BAUD RATE=4 MHz, 7 BITS PER BAUD
15	BAUD RATE=4 MHz, 8 BITS PER BAUD
16-256	RESERVED ON TRANSMIT, DISCARD FRAME ON RECEIVE

FIG. 10



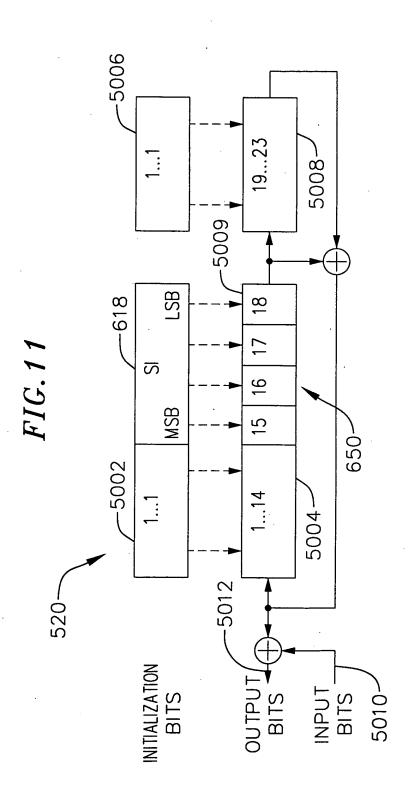


FIG. 12b 3 BITS PER BAUD

FIG. 12 α 2 BITS PER BAUD

01	00
11	10

	011	001	
010			000
110			100
	111	101	

FIG. 12d

5 BITS PER BAUD

FIG. 12c

4	BITS	PER	BAUD

•	BITS P				01010	01110	00110	00010	
0111	0110	0010	0011	01111	01101	01100	00100	00101	00111
0101	0100	0000	0001	01011	01001	01000	00000	00001	00011
	1100	1					P .		
1111	1110	1010	1011	11111	11101	11100	10100	10101	10111
						11110		•	

FIG.12ebits per baud

9

011010	011011	011001	011010 011011 011001 011000 001000 001001	001000	001001	001011	001010
011110	O 11111	011101	011100	001100	001101	001111	001110
010110	010111	010101	01010 01011 010101 010100 000100 000101 000111 000110	000100	0000101	000	0000110
010010	010011	010001	010000	000000	000001	000011	0000010
110010	110011	110001	110010 110011 110001 110000 100000 100011 100010	100000	100001	100011	100010
110110	110111	110101	11010 11011 110101 110100 100100 100111 100110	100100	100101	100111	100110
111110	• 111111	111101	111110 111111 111101 111100	101100 101101 101111 101110	101101	101111	101110
111010	1110111	111001	111010 111011 111001 111000 101000 101011 101010	101000	101001	101011	101010

2f
.12
FIG
H

PER BAUD

7 BITS

10.12	7					 - 	ı				
		0101100		0111101	0101101 0111101 0111100 0011100 0011101 0001101 0001100	0011100	0011101	0001101	0001100		
		0100100		0110101	0100101 0110101 0110100 0010100 0010101 0000101 0000100	0010100	0010101	0000101	00000100		
0110111	0110110	0110111 0110110 0110010	01100111	0110001	0110011 0110001 0110000 0010000 0010001 0010011 0010010 0010110 0010111	0010000	0010001	0010011	0010010	0010110	0010111
0111111	0111110	0111111 0111110 0111010	0111011	0111001	0111011 011100 0111000 0011001 0011011 0011010 0011110 0011111	00011000	0011001	0011011	0011010	0011110	0011111
0101111	0101110	0101111 0101110 0101010	0101011	0101001	0101011 0101001 0101000 0001000 0001001 0001011 0001010 0001111	0001000	0001000	0001011	0001010	00001110	000
0100111	0100110	0100111 0100110 0100010	0100011	0100001	0100011 0100001 0100000 0000000 0000001 0000011 0000010 0000110 00001111	0000000	0000001	0000011	0000010	00000110	0000111
1100111	1100110	1100111 1100110 1100010	1100011	1100001	110001 1100001 1100000 1000001 1000011 1000010 1000111	1000000	1000001	1000011	1000010	1000110	1000111
1101111	1101110	1101111 1101110 1101010	1101011	1101001	1101011 1101001 1101000 1001001 1001011 1001010 1001111 1001111	1001000	1001001	1001001	1001010	1001110	1001111
1111111	1111110	1111111 1111110 1111010	11110111	1111011 1111001 1111000	1111000	1011000 1011001 1011011 1011010 1011110 1011111	1011001	1011011	1011010	10111110	1011111
1110111	11101110	1110111 1110110 1110010	11100111	1110011 1110001 1110000	1110000	1010000 1010001 1010011 1010010 1010110 1010111	1010001	10100111	1010010	1010110	1010111
		1100100		1110101	1100101 1110101 1110100	1010100 1010101 1000101 1000100	1010101	1000101	1000100		
		1101100	1101101	1111101	1101101 1111101 1111100 1011100 1011101 1001101 1001100	1011100	1011101	1001101	1001100		

FIG. 129 8 BITS PER BAU

อาจาราร อาจาราร อาจารับร อาจารับรา อาจารับอา อาจารับออ | ออจารับออ ออจรับอา ออจรับอา ออจรับรอ ออจรับรา ออจรับรอ เขติจิเจอ 11อเอีเอา 11อเอิเบ 11อเอิเอ 11อเอิอเจ 11อเอิอเา 11อเอิจจ 11อเอิจจจ 1จอเจิจจา 1จอเจิจา 1จอเจิบา 1จอเจิเจ 1จอเจิเจ 0111111 01111110 01111010 01111011 01111001 01111000 00111000 00111001 0011101 0011110 0011110 00111110 00111101 อยาเอ็บบ อยาเอ็บอ อยาอ๊อบอ อยาอ๊อบ อยาอ๊ออบ อบาอ๊อออ ออบอ๊อออ ออบอ๊ออบ ออบอ๊อบ ออบอ๊บอ ออบอ๊บบ ออบอ๊บอ ออบอ๊บอ าหาอื่น นาเอื่นอ นนเอื้อเอ นนเอื้อน นนเอื้ออ นนเอื้อออ เอนอื้อออ เอนอื้ออา เอนอื่อน เอนอื่นอ เอนอื่นอ เอนอื่น เอนอื่น 0110Î110 0110Î010 0110Î011 0110Î001 0110Î000 | 0010Î000 0010Î001 0010Î101 0010Î010 0010Î110 0010Î111 0010Î1101 0010Î110 01101111 (0111110 01110101 01011010 11110101 01101101 11111101 11101101 11110100 01111100 01110100 1111100 11101100

VALUE	 + -	(12+5i)/9	(5+12i)/9	(1+i)/3	(1+i)/4	(1+i)/7	(1+i)/9	(1+i)/15
BITS PER BAUD REFERENCE POINT(S)	00	000	001	0000	00000	000000	0000000	00000000
BITS PER BAUD	2	3		4	5	9	7	∞

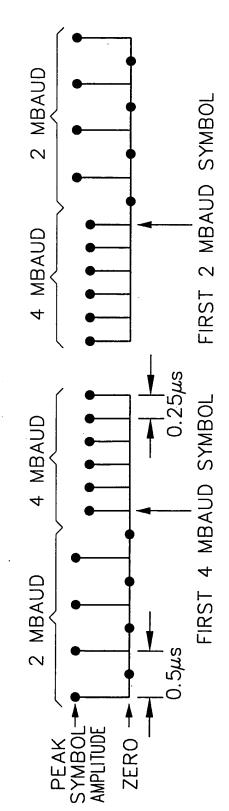
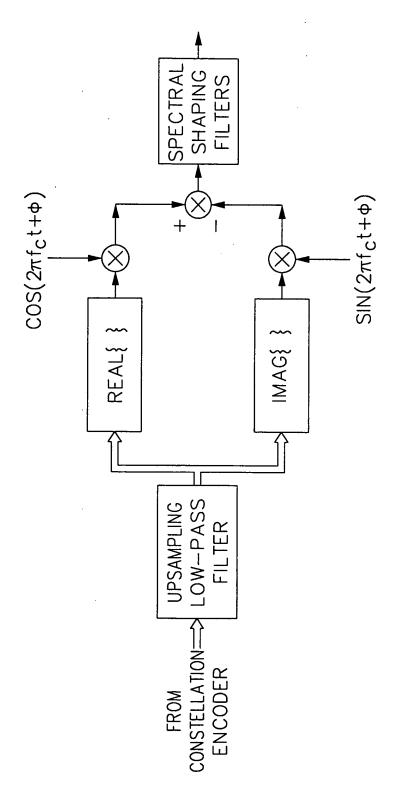


FIG. 15



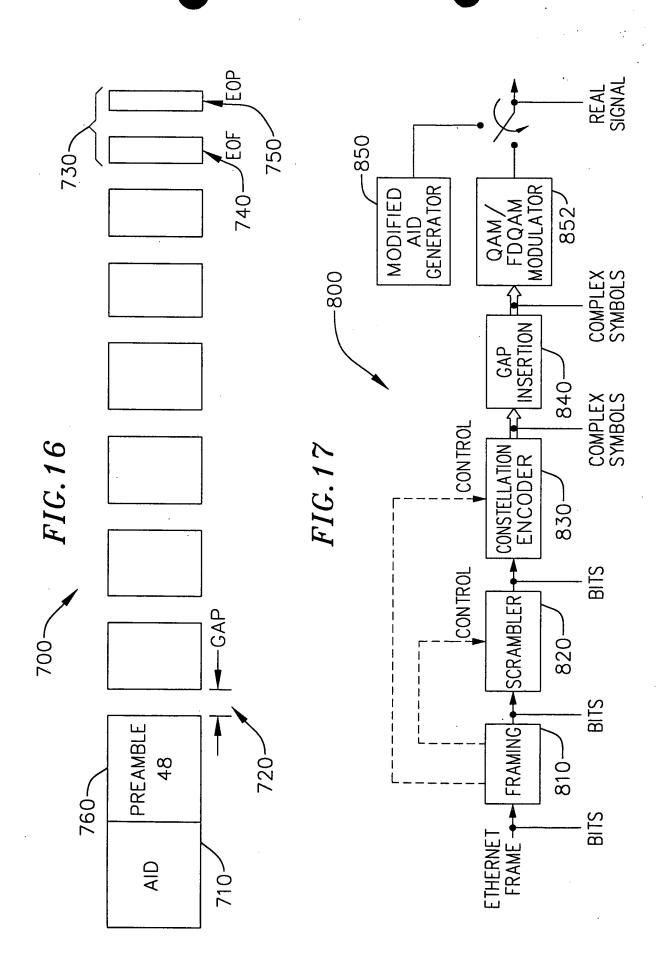
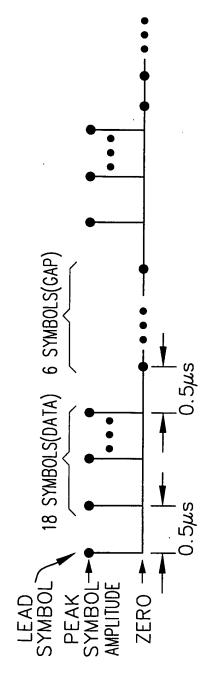
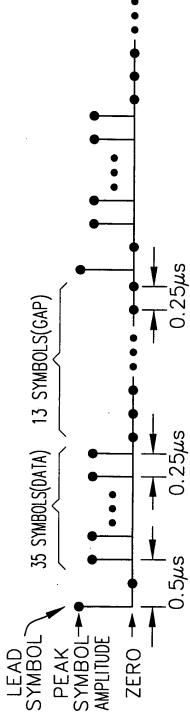


FIG. 18







M MODU	L0 2	P MODULO 2	M MODULO 2 P MODULO 2 EOF/EOP SEQUENCE
0		0	 4 SYMBOLS, DEFINED BY THE BITS 0xfc 12 ZERO SYMBOLS 1 SYMBOL, DEFINED BY THE BITS 00
0			• 4 SYMBOLS, DEFINED BY THE BITS 0x03 •12 ZERO SYMBOLS •1 SYMBOL, DEFINED BY THE BITS 11
1		0	 4 SYMBOLS, DEFINED BY THE BITS 0x03 12 ZERO SYMBOLS 1 SYMBOL, DEFINED BY THE BITS 11
_		-	4 SYMBOLS, DEFINED BY THE BITS 0xfc12 ZERO SYMBOLS1 SYMBOL, DEFINED BY THE BITS 00

M MODULO 2	M MODULO 2 P MODULO 4	EOF/EOP SEQUENCE
0	0	 4 SYMBOLS, DEFINED BY THE BITS Oxfc 12 ZERO SYMBOLS 1 SYMBOL, DEFINED BY THE BITS 00
0	-	• 4 SYMBOLS, DEFINED BY THE BITS 0x56 •12 ZERO SYMBOLS •1 SYMBOL, DEFINED BY THE BITS 10
0	2	• 4 SYMBOLS, DEFINED BY THE BITS 0x03 •12 ZERO SYMBOLS •1 SYMBOL, DEFINED BY THE BITS 11
0	23	• 4 SYMBOLS, DEFINED BY THE BITS 0xa9 •12 ZERO SYMBOLS •1 SYMBOL, DEFINED BY THE BITS 01
-	0	• 4 SYMBOLS, DEFINED BY THE BITS 0x03 •12 ZERO SYMBOLS •1 SYMBOL, DEFINED BY THE BITS 11
-	-	• 4 SYMBOLS, DEFINED BY THE BITS 0xq9 •12 ZERO SYMBOLS •1 SYMBOL, DEFINED BY THE BITS 01
-	2	• 4 SYMBOLS, DEFINED BY THE BITS Oxfc •12 ZERO SYMBOLS •1 SYMBOL, DEFINED BY THE BITS 00
-	3	•4 SYMBOLS, DEFINED BY THE BITS 0x56 •12 ZERO SYMBOLS •1 SYMBOL, DEFINED BY THE BITS 10

FIG.22

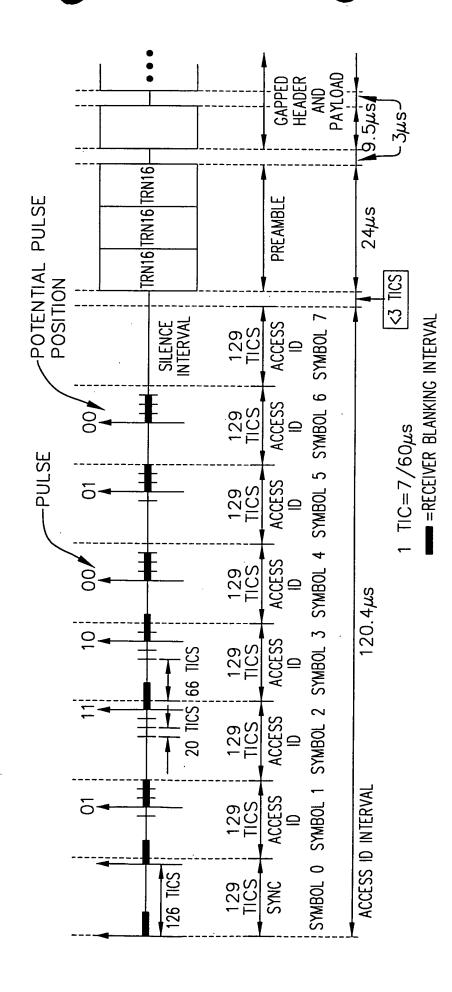


FIG.23 α

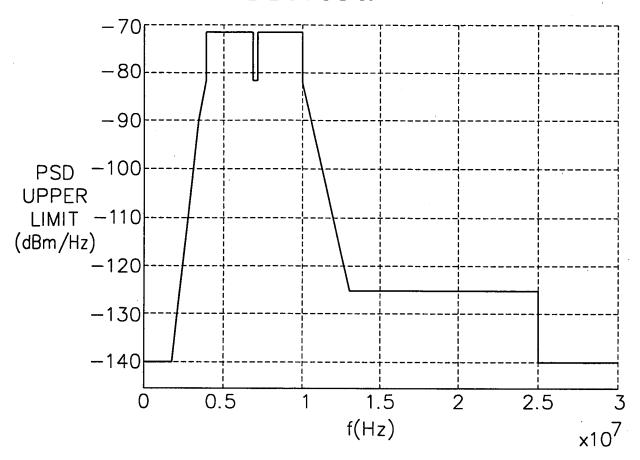
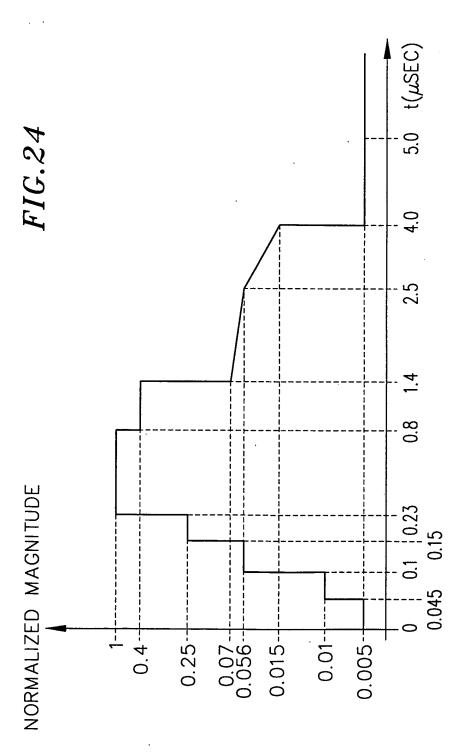
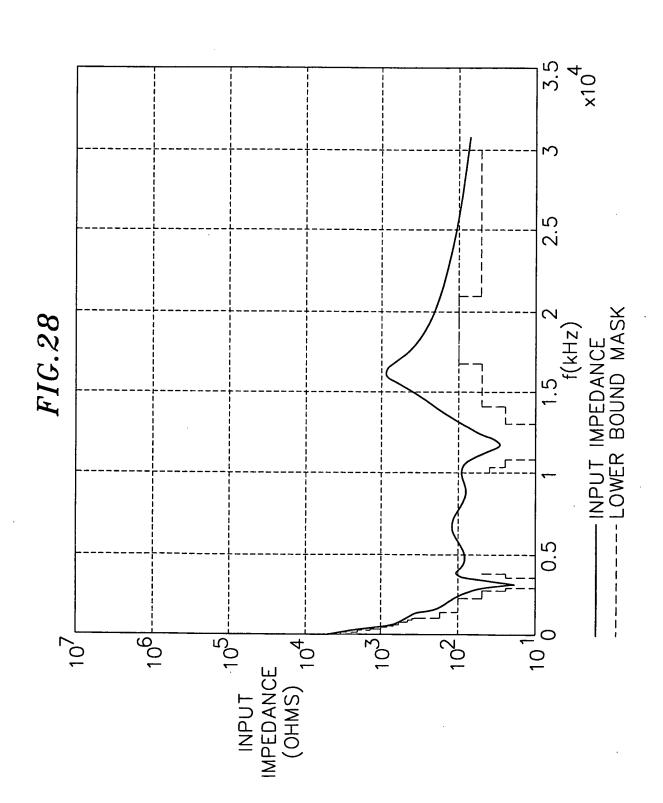


FIG.23b

FREQUENCY(MHz)	PSD LIMIT(dBm/Hz)
0.015 <f<=1.7< td=""><td>-140</td></f<=1.7<>	-140
1.7 <f<=3.5< td=""><td>-140+(f-1.7)*50.0/1.8</td></f<=3.5<>	-140+(f-1.7)*50.0/1.8
3.5 <f<=4.0< td=""><td>-90+(f-3.5)*17.0</td></f<=4.0<>	-90+(f-3.5)*17.0
4.0 <f<=7.0< td=""><td>-71.5</td></f<=7.0<>	-71.5
7.0 <f<=7.3< td=""><td>-81.5</td></f<=7.3<>	-81.5
7.3 <f<=10.0< td=""><td>-71.5</td></f<=10.0<>	-71.5
10.0 <f<=13.0< td=""><td>-81.5-(f-10.0)*43.5/3.0</td></f<=13.0<>	-81.5-(f-10.0)*43.5/3.0
13.0 <f<=25.0< td=""><td>-125</td></f<=25.0<>	-125
25.0 <f<=30.0< td=""><td>-140</td></f<=30.0<>	-140



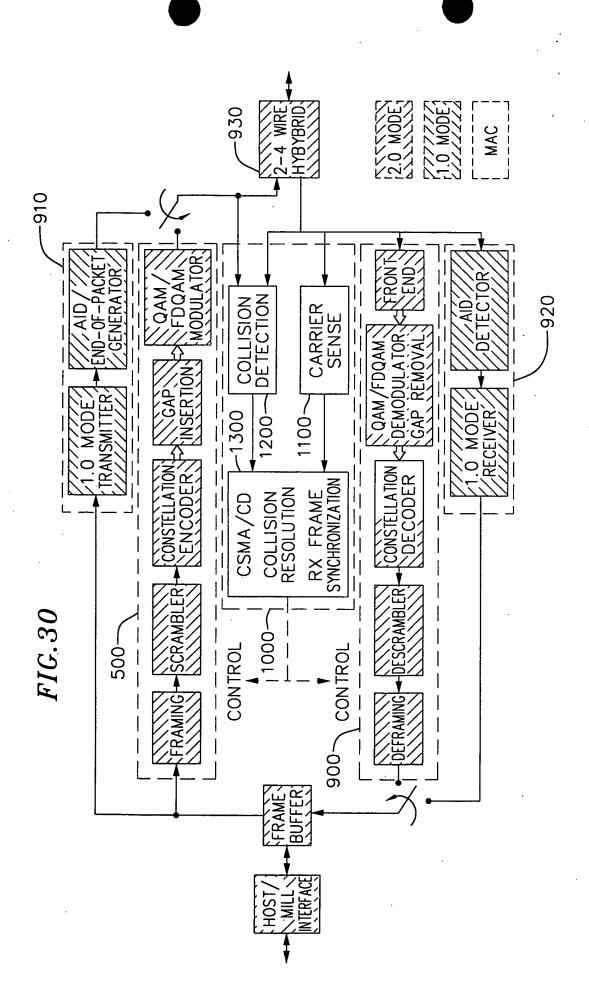


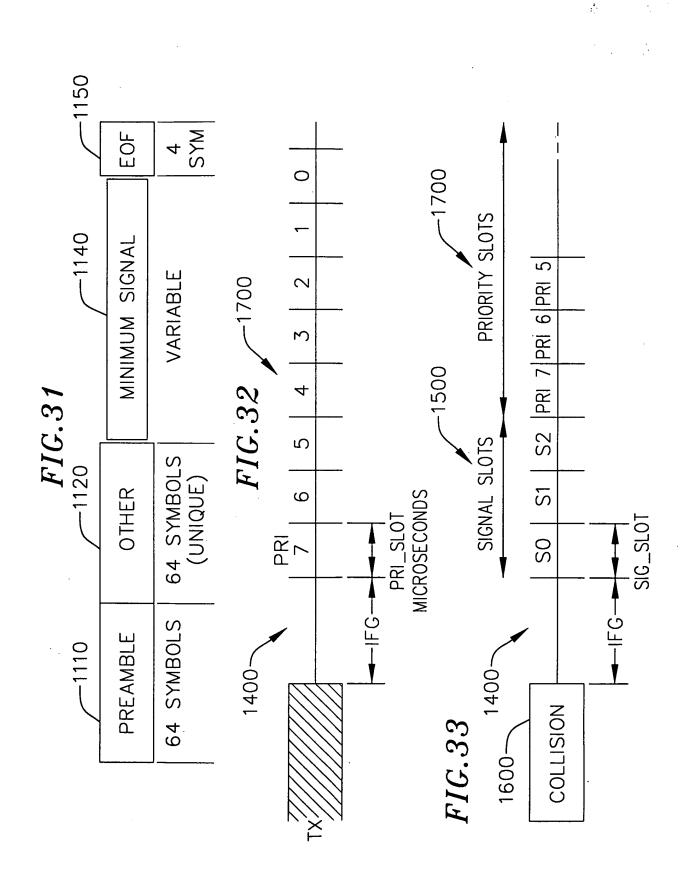
DATA – LINK L LINK MAC CONTROLLER O) HO CONTROLLER O) PEI C) DMA O) FRAME	FUNCTION
	LINK LAYER SIGNALING(DRIVER) a) RATE ADAPTATION, QoS AND 1M8 COMPATIBILITY b) LARQ ERROR RECOVERY c) LINK INTEGRITY AND CAPABILITY DISCOVERY
	MAC CONTROLLER LAYER FUNCTIONS a) HOST INTERFACE b) CONTROL AND STATUS REGISTERS, INTERRUPTS c) DMA TRANSFERS, DATA BUFFERING AND COMMAND LIST INTERPRETATION d) PERFORMANCE COUNTERS e) MAC ADDRESS FILTERING, WAKE—ON—LAN PROCESSING
	OPTIONAL MII INTERFACE (IN PHY-ONLY)
.	OPTIONAL LINK LAYER SIGNALING (IN PHY-ONLY)
FRAME o) FRA b) ERR	b) c) LINK INTEGRITY AND CAPABILITY DISCOVERY
	FRAME PROCESSING (TRANSMIT AND RECEIVE) a) FRAMING (FRAME BOUNDARY DELINEATION AND SYNCHRONIZATION) b) ERROR DETECTION (FCS GENERATION AND CHECK, FRAGMENT DETECTION)
V2 MAC MEDIA a) CSI b) COI	MEDIA ACCESS CONTROL (MAC) a) CSMA/CD b) COLLISION RESOLUTION (BACKOFF ALGORITHM)
PHY PHY PHYSIC a) COD	PHYSICAL CODING SUBLAYER a) CODING AND MODULATION, CARRIER SENSE, COLLISION DETECTION

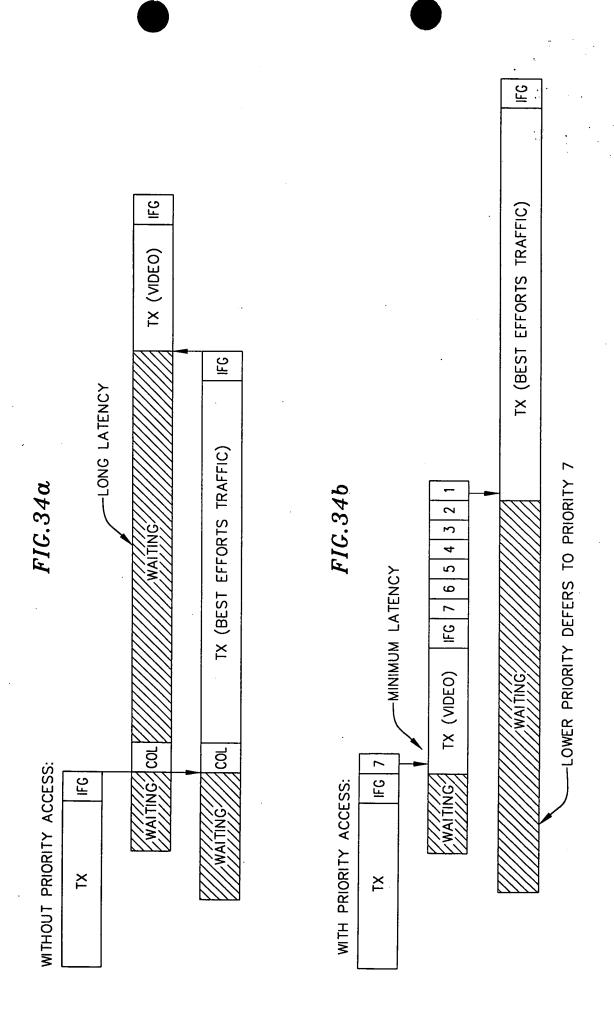
FREQUENCY RANGE(MHz)	MAXIMUM PEAK-TO- PEAKINTERFERER LEVEL(VOLTS)
0.01-0.1	6.0
0.1-0.6	3.3
0.6-1.7	1.0
1.7-4.0	0.1
7.0-7.3	0.1
10.0-10.15	0.1
14.0-14.35	0.28
18.068-18.168	0.5
21.0-21.45	0.5
24.89-24.99	0.5
28.0-29.7	0.5

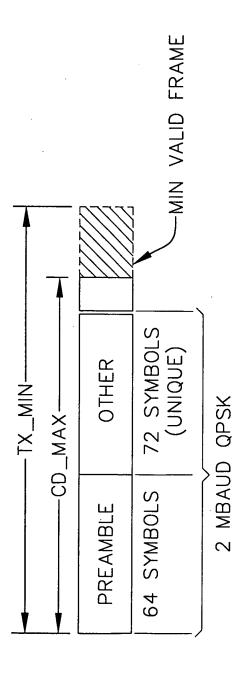
EDEOUENO:	
FREQUENCY	MAXIMUM PEAK-TO-
RANGE(MHz)	PEAKINTERFERER
	LEVEL(VOLTS)
0.01-0.1	20.0
0.1-0.6	20.0
0.6-1.7	10.0
1.7-4.0	2.5
7.0-7.3	2.5
10.0-10.15	2.5
14.0-14.35	5.0
18.068-18.168	5.0
21.0-21.45	5.0
24.89-24.99	5.0
28.0-29.7	5.0

FREQUENCY RANGE(kHz)	MIN.IMPEDANCE(OHMS)
0 <f<=0.285< td=""><td>1 M</td></f<=0.285<>	1 M
0.285 <f<=2.85< td=""><td>100 k</td></f<=2.85<>	100 k
2.85 <f<=28.5< td=""><td>10 k</td></f<=28.5<>	10 k
28.5 <f<=95< td=""><td>4.0 k</td></f<=95<>	4.0 k
95 <f<=190< td=""><td>2.0 k</td></f<=190<>	2.0 k
190 <f<=285< td=""><td>1.4 k</td></f<=285<>	1.4 k
285 <f<=380< td=""><td>1.0 k</td></f<=380<>	1.0 k
380 <f<=475< td=""><td>850</td></f<=475<>	850
475 <f<=570< td=""><td>700</td></f<=570<>	700
570 <f<=665< td=""><td>600</td></f<=665<>	600
665 <f<=760< td=""><td>525</td></f<=760<>	525
760 <f<=855< td=""><td>450</td></f<=855<>	450
855 <f<=950< td=""><td>400</td></f<=950<>	400
950 <f<=1000< td=""><td>350</td></f<=1000<>	350
1000 <f<=1400< td=""><td>175</td></f<=1400<>	175
1400 <f<=2300< td=""><td>100</td></f<=2300<>	100
2300 <f<=2850< td=""><td>50</td></f<=2850<>	50
2850 <f<=3085< td=""><td>25</td></f<=3085<>	25
3085 <f<=3725< td=""><td>10</td></f<=3725<>	10
3725 <f<=3935< td=""><td>25</td></f<=3935<>	25
3935 <f<=4000< td=""><td>50</td></f<=4000<>	50
10000 <f<=10450< td=""><td>40</td></f<=10450<>	40
10450 <f<=10925< td=""><td>25</td></f<=10925<>	25
10925 <f<=13125< td=""><td>10</td></f<=13125<>	10
13125 <f<=14175< td=""><td>25</td></f<=14175<>	25
14175 <f<=16800< td=""><td>50</td></f<=16800<>	50
16800 <f<=21000< td=""><td>100</td></f<=21000<>	100
21000 <f<=30000< td=""><td>50</td></f<=30000<>	50









SECTION	PARAMETER	ZΙΣ	MAX	UNITS
BASIC CSMA	NOMINAL_RMS_VOLTAGE	100	1	mVrms
	CS_RANGE	38	1	dB
	CS_IFG	7-0.67	29.0+0	MICROSECONDS
	CS_DEFER	1	12.0	MICROSECONDS
	MINFRAMESIZE	64	1	OCTETS
	MAXFRAMESIZE	1526	SEE 3.3.7.1	OCTETS
	TX_FRAME	92.5	SEE 3.3.7.1	MICROSECONDS
	NO_XT	0	4.0	MICROSECONDS
PRIORITY ACCESS	PRI_SLOT	21.0-Δ	21.0+Δ	MICROSECONDS
COLLISION	CD_FRAG	70.0-A	70.0+0	MICROSECONDS
DETECTION	CD_MIN	32.0		MICROSECONDS
	CD_THRESHOLD (RECOMMENDED)	1	92.0	MICROSECONDS
	CD_RANGE	36	1	dВ
	CD_OFFSET_EARLY	-	12.0	MICROSECONDS
	CD_OFFSET_LATE	1	15.0	MICROSECONDS
COLLISION	ATTEMPTLIMIT	256	256	
RESOLUTION	SIG_SLOT	32.0-D	32.0+0	MICROSECONDS

EXPLANATION	DESTINATION ADDRESS//////////////////////////////////	SOURCE ADDRESS//////////////////////////////////	Ox886c (LINK PROTOCOL FRAME, ASSIGNED TO ASSIGNEE BY IEEE)	0-RESERVED	1-RATE REQUEST CONTROL FRAME	Z-LINK INTEGRITY SHORT FRAME 3-CAPARITIES ANNOTHORAFIT	4-LARQ	5-VENDOR-SPECIFIC SHORT FORMAT TYPE	6-126 RESERVED	127 RESERVED	VALUES 128-255 CORRESPOND TO THE LONG SUBTYPE	NUMBER OF ADDITIONAL OCTETS IN THE CONTROL HEADER, STARTING WITH	THE SSVERSION FIELD (OR THE FIRST OCTET FOLLOWING SSLENGTH IF IT IS	NOT DEFINED AS SSVERSION) AND ENDING WITH THE SECOND (LAST) OCTET	OF THE NEXT ETHERTYPE FIELD. MIN IS 2 AND MAX IS 225	VERSION NUMBER OF THE CONTROL INFORMATION	CONTROL INFORMATION////////////////////////////////////	ETHERTYPE/LENGTH OF NEXT LAYER PROTOCOL, O IF NONE.	PADDING REQUIRED TO MEET MINIMUM IF DATA<41 OCTETS	FRAME CHECK SEQUENCE///////////////////////////////////
LENGTH			72 OCTETS/////	1 OCTET								1 OCTET				// OCTET//////	0-252 OCTETS	2 OCTETS	CTETS////	/4 OCTETS///////
FIELD	(DA////////	SA/////////	ETHERTYPE	SSTYPE								SSLENGTH				SSVERSION	()//////yiyo	NEXT ETHERTYPE	WAD WILL AND A PARTY OF THE PAR	K-CS////////

FIELD	LENGTH	EXPLANATION
DA/		DESTINATION ADDRESS//////////////////////////////////
ETHERTYPE	7.2. OCTETS//////	0x886c (LINK PROTOCOL FRAME. ASSIGNED TO EPIGRAM BY IEEE)
LSTYPE	2 OCTETS	32768 RESERVED 32769 VENDOR-SPECIFIC LONG-FORMAT
		65535 RESERVED
LSLENGTH	2 OCTETS	NUMBER OF ADDITIONAL OCTETS IN THE CONTROL HEADER, STARTING WITH
		NOT DEFINED AS SSVERSION) AND ENDING WITH THE SECOND (LAST) OCTET
		OF THE NEXT ETHERTYPE FIELD. MIN IS 2 AND MAX IS 65535.
LSVERSIÓN///	// OCTET//////	VERSION NUMBER OF THE FOLLOWING PROTOCOL INFORMATION
DATA	1-3 OCTETS//	KLSTYPE PROTOCOL DEPENDENT DATA
NEXT ETHERTYPE	2 OCTETS	ETHERTYPE/LENGTH OF NEXT LAYER PROTOCOL, O IF NONE.
PAD///////	CTETS////	PAD TO MINIMUM SIZE IF NEEDED/////////////
;F¢\$/////////	/4 octets//////	FRAMÉ CHÉCK SEQUENCE///////////////////////////////////

FIELD	LENGTH	MEANING
DA	6 OCTETS	DESTINATION ADDRESS
SA	6 OCTETS	SOURCE ADDRESS
ETHERTYPE	2 OCTETS	0x886c (LINK CONTROL FRAME)
SSTYPE	1 OCTET	=1
SSLENGTH	1 OCTET	NUMBER OF ADDITIONAL OCTETS IN THE CONTROL HEADER, STARTING WITH THE SSVERSION FIELD AND ENDING WITH THE SECOND(LAST) OCTET OF THE NEXT ETHERYPE FIELD. THE MINIMUM VALUE OF SSLENGTH IS 8 FOR SSVERSION 0.
SSVERSION	1 OCTET	=0
OPCODE	1 OCTET	OPERATION CODE FOR THIS CONTROL MESSAGE.
NUMBANDS	1 OCTET	NUMBER OF BANDS SPECIFIED IN THIS CONTROL. EACH BAND HAS A TWO OCTET DESCRIPTOR. THE FIRST BAND REFERS TO 2 MBAUD MODULATION RATE, THE NEXT TO 4 MBAUD. NUMBANDS SHALL BE 1 OR 2 ON TRANSMISSION FOR 10M8 STATIONS, AND STATIONS SHALL IGNORE BAND ENTRIES BEYOND BAND2 ON RECEIVE IF NUMBANDS IS LARGER THAN 2. THE VALUE O IS NOT ALLOWED.
NUMADDR	1 OCTET	NUMBER OF ADDRESSES SPECIFIED IN THE PAYLOAD OF THIS CONTROL MESSAGE. NUMADDR MAY BE ZERO. THE SA IN THE ETHERNET HEADER IS ALWAYS USED, AND IS REFERRED TO IN THE FOLLOWING SECTIONS AS REFADDRO.
BAND1_PE	1 OCTET	2MBAUD, 7 MHz CARRIER: THE PE VALUE THAT SHOULD BE USED TO SEND DATA WHEN THE 2MBAUD BAND IS SELECTED. (18)ARE THE ONLY VALID VALUES. THE VALUE 8 IS USED TO REQUEST HPNA 1.0 TYPE FRAMES, AND IS VALID ONLY WHEN THE NETWORK IS OPERATING IN VIM2MODE, AND ONLY IN BAND 1.
BAND1_RANK	1 OCTET	THE RANK ORDER OF THE REQDAS' PREFERENCE FOR THIS BAND, 1 IS HIGHEST PREFERENCE, AND THE OTHER BANDS ARE ASSIGNED SUCCESSIVELY LARGER RANK VALUES, NO TWO BANDS SHALL HAVE THE SAME RANK.
BAND2_PE		OPTIONAL, ONLY PRESENT IF NUMBANDS>=2. 4MBAUD, 7 MHz CARRIER: IF INCLUDED, THIS FIELD IS THE PE VALUE THAT SHOULD BE USED TO SEND DATA WHEN THE 4MBAUD BAND IS SELECTED, (0,915) ARE THE ONLY VALID VALUES.
BAND2_RANK	1 OCTET	OPTIONAL, ONLY PRESENT IF NUMBANDS>=2. RANK ORDER OF REQDAS' PREFERENCE FOR THIS BAND.
ŔĔŔĂĎĎŔĬ	6 OCTETS	OPTIONAL. PRESENT IF NUMADDR>=1. THE SECOND MAC ADDRESS FOR WHICH THE RATES ARE BEING SPECIFIED, TYPICALLY BROADCAST OR A MULTICAST ADDRESS.
REFADDR2	6 OCTETS	OPTIONAL. PRESENT IF NUMADDR>=2. THE THIRD MAC ADDRESS FOR WHICH THE RATES ARE BEING SPECIFIED.
		[ADDITIONAL INSTANCES OF REFADDR, UNTIL THE NUMBER OF REFADDR FIELDS EQUALS NUMADDR]
NEXT ETHERTYPE	2 OCTETS	=0
PAD		TO REACH MINFRAMESIZE IF REQUIRED
FCS	4 OCTETS	FRAME CHECK SEQUENCE

		On:	BAUD	QD.	BAUD	Qn:	an	BAUD							
MEANING	NOT SUPPORTED	2 BITS PER BA		4 BITS PER BA		6 BITS PER BA	7 BITS PER BA	8 BITS PER BA		BITS PER BAUD	3 BITS PER BAUD	BITS PER BAUD	5 BITS PER BAUD	BITS PER BAUD	
	MEANS THIS BAND IS NOT SUPPORTED	2 MBAUD FDQAM, 2 BITS PER BAUD	2 MBAUD FDQAM, 3 BITS PER	2 MBAUD FDQAM, 4 BITS PER BAUD	2 MBAUD FDQAM, 5 BITS PER	2 MBAUD FDQAM, 6 BITS PER BAUD	2 MBAUD FDQAM, 7 BITS PER BAUD	2 MBAUD FDQAM, 8 BITS PER	HPNA 1.0	4 MBAUD QAM, 2 BITS PER BAUD	4 MBAUD QAM, 3	4 MBAUD QAM, 4 BITS PER BAUD	4 MBAUD QAM, 5	4 MBAUD QAM, 6 BITS PER BAUD	
DATA RATE	N/A	4 MBIT/S	6 MBIT/S	8 MBIT/S	10 MBIT/S	12 MBIT/S	14 MBIT/S	16 MBIT/S	1 MBIT/S	8 MBIT/S	12 MBIT/S	16 MBIT/S	20 MBIT/S	24 MBIT/S	
PE	0	1	2	3	4	5	9	7	8	6	10	11	12	13	
FIG.40															_

MEANING	RATE CHANGE REQUEST	RATE TEST REQUEST	RATE TEST REPLY	RESERVED
OPCODE	0	•	2	3-255

4 MBAUD QAM, 7 BITS PER BAUD

PER BAUD

BITS

 ∞

MBAUD QAM,

4

28 MBIT/S

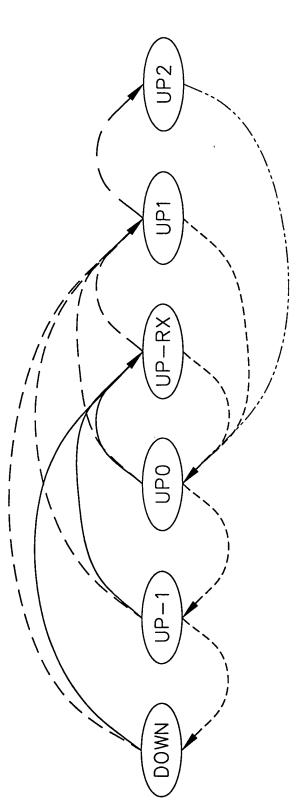
14

32 MBIT/S

15

BAND SPECIFICATION	A PAYLOAD ENCODING (PE) AND RANK ASSOCIATED WITH A GIVEN BAND. A BAND IS A SINGLE COMBINATION OF BAUD RATE, MODULATION TYPE (E.G. QAM OR FDQAM) AND CARRIER FREQUENCY. TWO BANDS ARE DEFINED IN HPNAVZ
LOGICAL CHANNEL, CHANNEL	A FLOW OF FRAMES FROM A SENDER TO ONE OR MORE RECEIVERS ON A SINGLE NETWORK SEGMENT, CONSISTING OF ALL THE FRAMES WITH A SINGLE COMBINATION OF DA AND SA.
RECEIVER	A STATION THAT RECEIVES FRAMES SENT ON A PARTICULAR CHANNEL. IF THE DESTINATION IS A UNICAST ADDRESS THERE IS AT MOST ONE RECEIVER. IF THE DESTINATION IS A GROUP ADDRESS (INCLUDING BROADCAST), THERE MAY BE MANY RECEIVERS.
RECEIVER PE	THE PREFERRED PE TO BE USED ON THIS CHANNEL, AS DETERMINED BY THE RECEIVER.
RRCF	RATE REQUEST CONTROL FRAME. SENT FROM THE RECEIVER TO THE SENDER TO EFFECT A CHANGE IN PE.
REFADDRO	THE SA IN THE ETHERNET HEADER OF THE RRCF FRAME. THIS IS THE DA OF THE RECEIVER (FOR THE CHANNEL), AND IS ALWAYS USED BY THE CHANNEL SENDER AS THE FIRST REFADDR PROCESSED.
REFADDR1 REFADDR <n></n>	OTHER ADDRESSES INCLUDING BROADCAST AND MULTICAST ADDRESSES FOR WHICH THE RECEIVER IS INDICATING RATE INFORMATION TO THE SENDER. THE CHANNEL RECEIVER'S STATION ADDRESS (REFADDRO) SHOULD NOT BE PUT IN THE LIST OF ADDITIONAL REFADDR'S.
	NOTE 1: AT LEAST ONE REFADDR FIELD IS NECESSARY TO SUPPORT RATE NECOTIATION FOR BROADCAST AND MULTICAST ADDRESSES SINCE THESE CANNOT BE USED AS THE SOURCE ADDRESS IN THE ETHERNET HEADER.
SENDER	THE SENDING STATION FOR A CHANNEL, USUALLY THE STATION OWNING THE SOURCE MAC ADDRESS.
SENDER PE	THE PREFERRED PE ASSOCIATED WITH A CHANNEL, AS NOTED BY THE SENDER.

 $FIG.43\alpha$



►RECEIVE ANY NON-BROADCAST FRAME OR LINK INDICATION

→ TIMEOUT OF 1 SECOND FREE-RUNNING TIMER-SEND LICF, REINITIALIZE FORCE_SEND

▼TIMEOUT-IF FORCE_SEND==0 THEN SEND LICF, REINIT FORCE_SEND ELSE DECREMENT FORCE_SEND

FIG. 43b

	DOWN	UP-1	UPO	UP-RX	UP1	UP2
RECEIVE 1.0 LINK	UP-RX	UP-RX	UP-RX	UP-RX	UP1	UP2
BROADCAST FRAME	(NONE)	(NONE)	(NONE)	(NONE)	(NONE)	(NONE)
RECEIVE BROADCAST	UP1	UP1	UP1	UP1	UP1	UP2
TRAME WITH SAESAL	SET SA1<-SA	SET SA1<-SA	SET SA1<-SA	SET SA1<-SA	(NONE)	(NONE)
RECEIVE BROADCAST	UP1	UP1	UP1	UP1	NATIVÈ: UP2	UP2
FRAME WITH SA !=SA1	SET SA1<-SA	SET SA1<-SA	SET SA1<-SA	SET SA1<-SA	COMPAT: UP1	
					(NONE)	(NONE)
TIMEOUT AND	NMOQ	NMOQ	UP-1	UPO	UPO	UPO
FORCE_SEND=0	SEND LICF, REINIT					
	FORCE_SEND	FORCE_SEND	FORCE_SEND	FORCE_SEND	FORCE_SEND	FORCE_SEND
TIMEOUT AND	DOWN	NMOQ	UP-1	UPO	UPO	UPO
r ORCE_SEND>0	SEND LICF, REINIT	SEND LICF, REINIT	SEND LICF, REINIT	SEND LICF,REINIT	SEND LICF, REINIT	DECREMENT
	FORCE_SEND	FORCE_SEND	FORCE_SEND	FORCE_SEND	FORCE_SEND	FORCE_SEND

FIELD	LENGTH	MEANING
DA	6 OCTETS	DESTINATION ADDRESS (FF.FF.FF.FF.FF)
SA	6 OCTETS	SOURCE ADDRESS
ETHERTYPE	2 OCTETS	0x886c (LINK CONTROL FRAME)
SSTYPE	1 OCTET	=2
SSLENGTH	1 OCTET	NUMBER OF ADDITIONAL OCTETS IN THE CONTROL HEADER, STARTING WITH THE SSVERSION FIELD AND ENDING WITH THE SECOND(LAST) OCTET OF THE NEXT ETHERYPE FIELD. MINIMUM IS 4 FOR SSVERSION O.
SSVERSION	1 OCTET	=0
LI_PAD	1 OCTET	IGNORED ON RECEPTION.
NEXT ETHERTYPE	2 OCTETS	=0
PAD	41 OCTETS	ANY VALUE OCTET
FCS	4 OCTETS	

FIELD	LENGTH	MEANING
		MEANING
DA	6 OCTETS	
SA	6 OCTETS	SOURCE ADDRESS OF THE STATION THAT TRANSMITTED THIS FRAME
ETHERTYPE	†	0x886c (LINK CONTROL FRAME)
SSTYPE	1 OCTET	= 3
SSLENGTH	1 OCTET	NUMBER OF ADDITIONAL OCTETS IN THE CONTROL HEADER, STARTING WITH THE SSVERSION FIELD AND ENDING WITH THE SECOND(LAST) OCTET OF THE NEXT ETHERYPE FIELD. MINIMUM IS 32 FOR SSVERSION O.
SSVERSION	1 OCTET	=0
CSA_ID_SPACE	1 OCTET	IDENTIFIES THE REGISTRATION SPACE OF CSA_MFR_ID 0-UNSPECIFIED 1-JEDEC 2-PCI
CSA_MFR_ID	2 OCTETS	HW MANUFACTURER ID-IDENTIFIES THE MANUFACTURER OF THE PHY CONTROLLER CHIP. THE PURPOSE OF THIS FIELD PLUS THE PART NUMBER AND REVISION IS TO IDENTIFY SPECIFIC IMPLEMENTATIONS OF THE PHY SPECIFICATION. THIS IS NOT A BOARD OR ASSEMBLY-LEVEL IDENTIFIER.
CSA_PART_NO	2 OCTETS	HW MANUFACTURER PART NUMBER-THE PART NUMBER OF THE PHY CONTROLLER CHIP.
CSA_REV	1 OCTET	HW REVISION
CSA_OPCODE	1 OCTET	0-ANNOUNCE 1-REQUEST
CSA_MTU	2 OCTETS	MAXIMUM SIZE LINK-LEVEL PDU THIS RECEIVER ACCEPTS IN OCTETS, THE DEFAULT VALUE IS 1526 OCTETS. THIS IS ALSO THE MINIMUM VALUE THAT SHALL BE ACCEPTED BY ALL ILINE10 STATIONS.
CSA_SA	6 OCTETS	SOURCE ADDRESS OF THE STATION THAT GENERATED THIS CSA FRAME
CSA_PAD	2 OCTETS	RESERVED FOR VERSION O. SHALL BE SENT AS O, IGNORED ON RECEPTION.
CSA_ CURRENTTXSET	4 OCTETS	CONFIGURATION FLAGS, PLUS ALL CURRENT IN-USE STATUS FOR THIS STATION.
CSA_ OLDESTTXSET	4 OCTETS	A COPY OF THE "OLDEST" TX FLAGS FOR THIS STATIONS, FROM THE PERIOD ENDING AT LEAST ONE PERIOD (MINUTE) EARLIER.
CSA_ CURRENTRXSET	4 OCTETS	THE UNION OF RECENT FLAGS RECEIVED FROM OTHER STATIONS.
NEXT ETHERTYPE	2 OCTETS	=0
PAD		PAD TO REACH MINFRAMESIZE IF NECESSARY
FCS	4 OCTETS	

	7. (always set)	9	5.	4.	3.	2.	1.	O. (always set)	sceived.	ission of			sceived.	figV1M2.		config flags.	sceived.		,		-		
Description	Station is (was) transmitting frames with LL priority 7. (always set)	Station is (was) transmitting frames with LL priority 6.	Station is (was) transmitting frames with LL priority 5.	Station is (was) transmitting frames with LL priority 4.	Station is (was) transmitting frames with LL priority 3.	Station is (was) transmitting frames with LL priority 2.	Station is(was) transmitting frames with LL priority 1.	Station is(was) transmitting frames with LL priority 0. (always set)	Shall be sent as 0 and ignored by 2.0 stations when received.	This station does not support the reception or transmission of	compatibility frames (VIM2 frames).	This station supports 4 megabaud payload encodings.	Shall be sent as 0 and ignored by 2.0 stations when received.	Force use of 10M8 mode, defers to Config1 and ConfigV1M2.	Force use of VIM2 mixed mode, defers to ConfigV1.	Force use of HPNA 1.x mode, highest precedence of config flags.	Shall be sent as 0 and ignored by 2.0 stations when received.	This station's highest supported HPNA version:	0x000 – Reserved	0x001 - HPNA1.0	0x010 - iLine10	0x011-0x111 Reserved	
Length	1	I	I	1		_	1	1	9	1		1	∞	1	-	1	2	3					
Field	TxPriority7	TxPriority6	TxPriority5	TxPriority4	TxPriority3	TxPriority2	TxPriority1	TxPriority0	Reserved	No VIM2 Frames	1	Supports 4Mbaud	Reserved	Config V2	ConfigV1M2	ConfigVI	Reserved	Highest Version)				
Octet	Flags0	0							Flags				Flage?	Flore3	1 lags		- -						

Fig. H

DeleteSet	A computed value used to detect newly removed status information.
NewRxFlags,	Computed values used to detect new status flags.
ReallyNewRxFlags	

Fig. 47

RetransmitTimer A one-shot timer, set to a random interval in the range 1 ms to 1000 ms, inclusive, after sending a CSA in which CSA_CurrentTxSet and CSA_OldestTxSet are different, or when a CSA is received with the CSA_Opcode set to 1 (Request). This timer is cancelled if a second CSA is sent as a result of the CSP_Timer expiring.

Fig. 48

NewTxSet	The set of flags announced during the current CS period, updated immediately when a new link layer priority is used or new volatile status is set. When the CSP_Timer expires, CurrentTxSet is given the value of NewTxSet, and NewTxSet is reset to the default set.
PreviousTxSet	The set of flags that were announced during the previous CS period (the ending value of NewTxSet from the previous CS period).
OldestTxSet	The set of flags rolled over from PreviousTxSet at the end of the previous CS period (the value of PreviousTxSet from the previous CS period). Flags that are present in OldestTxSet and missing from PreviousTxSet were not actively used or detected (by the sender) for an entire CS period, and will be deleted. This set is sent in CSA frames as CSA_OldestTxSet.
NewRxSet	The union of all CSA_CurrentTxSet flags received in CSAs from other stations during the current CS period. This is rolled over into PreviousRxSet at the expiration of the CSP_Timer, then reset to the empty set (0).
	A volatile status flag (one of the priority flags) in this set may subsequently be deleted if the only station previously announcing that flag stops using it. The deletion from that station's CurrentTxSet is noted by the difference from its OldestTxSet. The fact that it was the only sender is noted by the absence of the flag in that station's CurrentRxSet, indicating that it has received the flag from no other stations.
	If deleted from NewRxSet, a flag shall also be deleted from PreviousRxSet.
PreviousRxSet	The set of announced flags received during the previous CS period (the ending value of NewRxSet from the previous CS period). A flag may be deleted from this set, as described under NewRxSet above.

Erg. 49

CurrentTxSet	The set of flags that were announced during the previous CS period plus any new status and priority flags (or changed configuration/options flags) used during the current CS period, i.e. the union of PreviousTxSet and NewTxSet. This set is sent in CSA frames as CSA_CurrentTxSet.
CurrentRxSet	The union of NewRxSet, PreviousRxSet. This set is sent in CSA frames as CSA_CurrentRxSet.
CurrentInUseSet	The union of CurrentTxSet and CurrentRxSet. This set is used to determine the operational mode of the station and to modify the mapping between the LL priority of the frame and the actual PHY priority usage.

Ag. 50

7	3
7	_
U	7
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	1
7	J

	7	ES	9
TX LL PRIORITY	9)RITI	7
	5 6	PRIC	2
	4	₹	4
	3 4	DEFAULT TX PHY PRIORITIES	3 4
	1 2	<u> </u>	ļ
		FAU	0
	0	DE	2
		NY)	—
		S (A	L
$FIG.51\alpha$		PRIORITIES (ANY)	→ X X X
7.5		PRIOF	×
FIC		SEF	<u> </u>
		TINU	
		CURRENTI	Z
		CUF	∢

	7	ES	7	9	7	9
	9)RITI	191	7	12	7
RITY	5	PRI(191	(2)	91	9
RIO	4	PHY	191	2	9	4/
TX LL PRIORITY	3	≥	191	12/	2	4
×	2	REMAPPED TX PHY PRIORITIES	5/	/ \ \	4	
	1	MAP	5/	4/	4	121
	0	R	9	5	5	3
			7	7	7	2
FIG.51b		CURRENTINUSE PRIORITIES (LL)		9		9
		NITIE TIE				5
7.5		PRI(4	
FI(USE				3
•		NIL				
		RRE			_	
		ರ	0	0	0	0

FIG.52a

FIELD	LENGTH	MEANING
DA	6 OCTETS	DESTINATION ADDRESS
SA	6 OCTETS	SOURCE ADDRESS
ETHERTYPE	2 OCTETS	0x886c (LINK CONTROL FRAME)
SSTYPE	1 OCTET	=4
SSLENGTH	1 OCTET	NUMBER OF ADDITIONAL OCTETS IN THE CONTROL HEADER, STARTING WITH THE SSVERSION FIELD AND ENDING WITH THE SECOND(LAST) OCTET OF THE NEXT ETHERYPE FIELD. SSLENGTH IS 6 FOR SSVERSION 0.
SSVERSION	1 OCTET	=0
LARQ_HDR DATA	3 OCTETS	LARQ CONTROL HEADER DATA WITH LARQ_CTL BIT=1,LARQ_NACK=0.
NEXT ETHERTYPE	2 OCTETS	=0
PAD	38 OCTETS	
FCS	4 OCTETS	FRAME CHECK SEQUENCE

FIG.52b

		
FIELD	LENGTH	MEANING
DA	6 OCTETS	DESTINATION ADDRESS
SA	6 OCTETS	SOURCE ADDRESS
ETHERTYPE	2 OCTETS	0x886c (LINK CONTROL FRAME)
SSTYPE	1 OCTET	= 4
SSLENGTH	1 OCTET	NUMBER OF ADDITIONAL OCTETS IN THE CONTROL HEADER, STARTING WITH THE SSVERSION FIELD AND ENDING WITH THE SECOND(LAST) OCTET OF THE NEXT ETHERYPE FIELD. SSLENGTH IS 12 FOR NACK FRAMES WITH SSVERSION O.
SSVERSION	1 OCTET	=0
LARQ_HDR DATE	3 OCTETS	LARQ CONTROL HEADER DATA WITH LARQ_CTL BIT=1,LARQ_NACK=17.
NACK_DA	6 OCTETS	ORIGINAL DESTINATION ADDRESS
NEXT ETHERTYPE	2 OCTETS	=0
PAD	32 OCTETS	
FCS	4 OCTETS	FRAME CHECK SEQUENCE

FIG.52c

FIELD	LENGTH	MEANING
DA	6 OCTETS	DESTINATION ADDRESS (FROM ORIGINAL ETHERNET PDU)
SA	6 OCTETS	SOURCE ADDRESS (FROM ORIGINAL ETHERNET PDU)
ETHERTYPE	2 OCTETS	0x886c (LINK CONTROL FRAME)
SSTYPE	1 OCTET	=4
SSLENGTH	1 OCTET	NUMBER OF ADDITIONAL OCTETS IN THE CONTROL HEADER, STARTING WITH THE SSVERSION FIELD AND ENDING WITH THE SECOND(LAST) OCTET OF THE NEXT ETHERYPE FIELD. SSLENGTH IS 6 FOR SSVERSION 0.=6
SSVERSION	1 OCTET	=0
LARQ_HDR DATA	3 OCTETS	LARQ ENCAPSULATION HEADER DATA (WITH LARQ_CTL BIT=0)
NEXT ETHERTYPE	2 OCTETS	FROM ORIGINAL ETHERNET PDU
PAYLOAD	MIN 46 OCTETS	FROM ORIGINAL ETHERNET PDU PAYLOAD
FCS	4 OCTETS	FRAME CHECK SEQUENCE

FIG.52d

	·	·	
OCTET	FIELD	LENGTH	MEANING
FLAGS0	LARQ_MULT	1 BIT	MULTIPLE RETRANSMISSION FLAG. O IN THE ORIGINAL TRANSMISSION OF A DATA FRAME. FOR RETRANSMITTED FRAMES (LARQ_RTX=1), SET TO THE VALUE OF LARQ_MULT IN THE NACK FRAME THAT CAUSED THE RETRANSMISSION. THIS CAN BE USED BY RECEIVERS TO MEASURE THE ROUND—TRIP TIMES ASSOCIATED WITH THE MISS/NACK/RECEIVE—RTX PROCESS.
	LARQ_RTX	1 BIT	O FOR FIRST TRANSMISSION OF A FRAME, 1 IF FRAME IS RETRANSMITTED. STATIONS NOT IMPLEMENTING LARQ SHALL DROP ANY DATA FRAME IF THIS BIT IS 1.
	LARQ_NORTX	1 BIT	O IF IMPLEMENTATION SUPPORTS RETRANSMISSION, 1 IF ONLY PRIORITY IS MEANINGFUL. MAY BE USED ON A PERCHANNEL BASIS.
	LARQ_NEWSEQ	1 BIT	1 IF THE SEQUENCE NUMBER SPACE FOR THE CHANNEL HAS BEEN RESET, AND OLDER SEQUENCE NUMBERS SHOULD NOT BE NACKED, O OTHERWISE.
	LARQ_CTL	1_BIT	"O" WHEN IN ENCAPSULATION FORMAT
	PRIORITY	3 BITS	LINK LAYER PRIORITY OF THIS FRAME
FLAGS1_SEQ0	RESERVED	4 BITS	RESERVED, SHALL BE 0
	LARQ_SEQ_HIGH	4 BITS	HIGH 4 BITS OF SEQUENCE NUMBER
SEQ1	LARQ_SEQ_LOW	8 BITS	LOW 8 BITS OF SEQUENCE NUMBER

FIG.52e

OCTET	FIELD	LENGTH	MEANING
FLAGS0	LARQ_MULT	1 BIT	MULTIPLE RETRANSMISSION FLAG. 0 IN THE FIRST NACK SENT FOR A GIVEN SEQUENCE NUMBER, 1 IN ALL RETRANSMITTED NACKS.
	LARQ_NACK	3 BITS	NACK COUNT IF 0 IN A LARQ CONTROL FRAME, THEN THIS IS A REMINDER.
	LARQ_CTL	1 BIT	SET TO 1 FOR LARQ CONTROL HEADER DATA FORMAT
	PRIORITY	3 BITS	LINK LAYER PRIORITY OF THIS FRAME
FLAGS1_SEQ0	RESERVED	4 BITS	RESERVED, SHALL BE 0
	LARQ_SEQ_HIGH	4 BITS	HIGH 4 BITS OF SEQUENCE NUMBER
SEQ1	LARQ_SEQ_LOW	8 BITS	LOW 8 BITS OF SEQUENCE NUMBER

FIG.52f.1

CONTROL FRAME	A FRAME GENERATED BY A LARQ PROTOCOL MODULE THAT CONTAINS ONLY A LARQ PROTOCOL HEADER AS ITS PAYLOAD.
CURRENT SEQUENCE NUMBER	THE MOST RECENTLY RECEIVED NEW SEQUENCE NUMBER FOR A CHANNEL.
DATA FRAME	ANY STANDARD ETHERNET FRAME FROM HIGHER (THAN LARQ) PROTOCOL LAYERS. A LARQ-ENABLED STATION ENCAPSULATES THE ORIGINAL PAYLOAD OF AN ETHERNET FRAME BY INSERTING A LARQ HEADER (SHORTER FORM CONTROL HEADER WITH LARQ_HDR DATA) BETWEEN THE SOURCE ADDRESS AND THE REMAINDER OF THE FRAME BEFORE THE FRAME IS PASSED DOWN TO THE DRIVER FOR TRANSMISSION ON THE NETWORK.
FORGET TIMER	AN IMPLEMENTATION DEPENDENT MECHANISM TO ALLOW A RECEIVER TO RESET THE SEQUENCE NUMBER SPACE OF A CHANNEL WHEN A RECEIVED SEQUENCE NUMBER IS NOT THE NEXT EXPECTED (CURRENT SEQUENCE NUMBER+1). ONE SECOND IS A SUGGESTED DEFAULT VALUE.
HOLD TIMER, LOST TIMER	AN IMPLEMENTATION DEPENDENT TIMING MECHANISM THAT LIMITS THE TIME A RECEIVER WILL HOLD ONTO A RECEIVED FRAME WHILE WAITING FOR A MISSING FRAME TO BE RETRANSMITTED. CONCEPTUALLY, THERE IS ONE SUCH TIMER PER MISSING SEQUENCE NUMBER. THE TIMER INTERVAL IS MAXIMUM HOLD INTERVAL.
LOGICAL CHANNEL, CHANNEL	A FLOW OF FRAMES FROM A SENDER TO ONE OR MORE RECEIVERS ON A SINGLE NETWORK SEGMENT CONSISTING OF ALL THE FRAMES WITH A SINGLE COMBINATION OF DESTINATION ADDRESS, SOURCE ADDRESS, AND LINK LAYER PRIORITY.
NACK, NACK, NACK	AN INDICATION FROM A RECEIVER TO A SENDER REQUESTING RETRANSMISSION OF ONE OR MORE FRAMES. ALSO, THE ACTION OF PROVIDING SUCH AN INDICATION. E.G. "TO NACK A SEQUENCE NUMBER" MEANING TO SEND A NACK INDICATION.
NACK TIMER	AN IMPLEMENTATION DEPENDENT TIMING MECHANISM USED BY A RECEIVER TO RETRANSMIT NACKS FOR MISSING SEQUENCE NUMBERS. CONCEPTUALLY, THERE IS ONE SUCH TIMER PER MISSING SEQUENCE NUMBER PER LOGICAL CHANNEL. THE TIMER IS RESET EACH TIME A NACK IS SENT FOR A SEQUENCE NUMBER. THE TIMER INTERVAL IS NACK RETRANSMISSION INTERVAL.
NEW	A NEW SEQUENCE NUMBER IS ONE WHOSE DIFFERENCE FROM THE CURRENT SEQUENCE NUMBER FOR THE CHANNEL, MODULO THE SIZE OF THE SEQUENCE NUMBER SPACE AND CONSIDERED AS A SIGNED INTEGER, IS GREATER THAN O. IN PARTICULAR, THE NUMBERS (CURRENT+1) THROUGH (CURRENT+2047).
OLD	AN OLD SEQUENCE NUMBER IS ONE WHOSE DIFFERENCE FROM THE CURRENT SEQUENCE NUMBER FOR THE CHANNEL, MODULO THE SIZE OF THE SEQUENCE NUMBER SPACE AND CONSIDERED AS A SIGNED INTEGER, IS LESS THAN OR EQUAL TO 0. IN PARTICULAR, THE NUMBERS (CURRENT-2048) THROUGH (CURRENT) ARE OLD. NOTE, HOWEVER, THAT MOST OF THE OLD SEQUENCE NUMBERS ARE ALSO OUT-OF-SEQUENCE.

FIG.52f.2

OUT OF SEQUENCE	ANY SEQUENCE NUMBER THAT FALLS OUTSIDE A REASONABLE RANGE, OLD OR NEW, OF THE CURRENT SEQUENCE NUMBER FOR A LOGICAL CHANNEL IS CONSIDERED OUT OF SEQUENCE. IT IS RECOMMENDED THAT PLUS OR MINUS TWICE THE VALUE OF MAXIMUMSAVELIMIT (DEFINED BELOW) BE USED AS THE "REASONABLE RANGE" WHEN CHECKING FOR OUT OF SEQUENCE.
RECEIVER	A STATION THAT RECEIVES FRAMES SENT ON A PARTICULAR CHANNEL IF THE DESTINATION ADDRESS IS A UNICAST ADDRESS THERE IS AT MOST ONE RECEIVER. IF THE DESTINATION ADDRESS IS A GROUP ADDRESS (INCLUDING BROADCAST), THEN THERE MAY BE MANY RECEIVERS.
REMINDER	A CONTROL FRAME SENT BY THE CHANNEL SENDER WITH THE MOST RECENTLY USED SEQUENCE NUMBER FOR A CHANNEL WHICH HAS BEEN INACTIVE FOR REMINDER INTERVAL AFTER ITS MOST RECENT DATA FRAME.
REMINDER TIMER	AN IMPLEMENTATION DEPENDENT TIMING MECHANISM USED BY A SENDER TO GENERATE A REMINDER FRAME AFTER A PERIOD OF INACTIVITY FOR A CHANNEL. THE TIMER IS RESET EACH TIME A NEW DATA FRAME IS TRANSMITTED. CONCEPTUALLY, THERE IS ONE SUCH TIMER PER CHANNEL. THE TIMER INTERVAL IS REMINDER INTERVAL.
SAVE TIMER	AN IMPLEMENTATION DEPENDENT TIMING MECHANISM THAT LIMITS THE TIME A SENDER WILL SAVE A FRAME WAITING FOR RETRANSMISSION REQUESTS. THE TIMER INTERVAL IS MAXIMUM SAVE INTERVAL.
SENDER	THE SENDING STATION FOR A CHANNEL, USUALLY THE STATION OWNING THE SOURCE MAC ADDRESS.
SEQUENCE NUMBERS	SEQUENCE NUMBERS ARE MAINTAINED SEPARATELY FOR EACH LOGICAL CHANNEL BY THE SENDER.

SEND SEQUENCE NUMBER	THE SEQUENCE NUMBER OF THE MOST RECENTLY TRANSMITTED DATA FRAME.
REMINDER TIMER INTERVAL	A FIXED INTERVAL. THE DEFAULT IS 50 MS. LOWER VALUES WILL INCREASE THE OVERHEAD OF REMINDERS ON NETWORK LOAD, WHILE HIGHER VALUES INCREASE THE LATENCY FOR END-OF-SEQUENCE FRAMES REQUIRING RETRANSMISSION. IMPLEMENTATIONS SHOULD NOT USE VALUES OUTSIDE OF THE RANGE 25-75 MS, BASED ON 150 MS MAXIMUM SAVE AND HOLD TIMES.
MINIMUM RETRANSMISSION INTERVAL	AN INTERVAL USED TO PREVENT TOO-FREQUENT RETRANSMISSIONS OF A SINGLE FRAME. MOST IMPORTANT FOR MULTICAST CHANNELS. THE DEFAULT IS 10 MS.
MAXIMUM SAVE LIMIT	THE MAXIMUM NUMBER OF FRAMES THAT WILL BE SAVED FOR A SINGLE LOGICAL CHANNEL. THIS IMPLEMENTATION DEPENDENT, AND VARIES WITH THE MAXIMUM FRAME RATE THE SENDER IS EXPECTED TO SUPPORT. VALUES OF 100 OR MORE CAN BE USEFUL FOR HIGH-SPEED APPLICATIONS SUCH AS VIDEO.
MAXIMUM SAVE INTERVAL	THE MAXIMUM TIME THAT THE SENDER WILL NORMALLY SAVE A FRAME FOR POSSIBLE RETRANSMISSION. THE DEFAULT IS 150 MS.

CURRENT SEQUENCE NUMBER	THE MOST RECENT SEQUENCE NUMBER RECEIVED IN A LARQ HEADER FOR THE CHANNEL, WHETHER IN A DATA FRAME OR A REMINDER CONTROL FRAME.
OLDEST MISSING SEQUENCE NUMBER	THE OLDEST SEQUENCE NUMBER FOR A FRAME NOT YET RECEIVED WHICH HAS NOT BEEN DECLARED LOST.
MAXIMUM HOLD INTERVAL	THE LONGEST INTERVAL THAT A FRAME WILL BE HELD AWAITING AN EARLIER MISSING FRAME. THE DEFAULT IS TO USE THE SAME VALUE AS MAXIMUM SAVE INTERVAL, WHICH HAS A DEFAULT OF 150 MS.
MAXIMUM RECEIVE LIMIT	THE MAXIMUM NUMBER OF FRAMES THAT A RECEIVER WILL BUFFER WHILE AWAITING AN EARLIER MISSING FRAME. THE DEFAULT SHOULD NORMALLY BE THE SAME AS THE MAXIMUM SAVE LIMIT.
NACK RETRANSMISSION INTERVAL	THE INTERVAL AFTER WHICH A RECEIVER WILL RETRANSMIT A NACK CONTROL FRAME FOR A MISSING SEQUENCE NUMBER, WITH THE EXPECTATION THAT EARLIER NACK CONTROL FRAMES OR DATA FRAME RETRANSMISSIONS WERE LOST. THE DEFAULT FOR FIXED IMPLEMENTATIONS IS 20 MS.

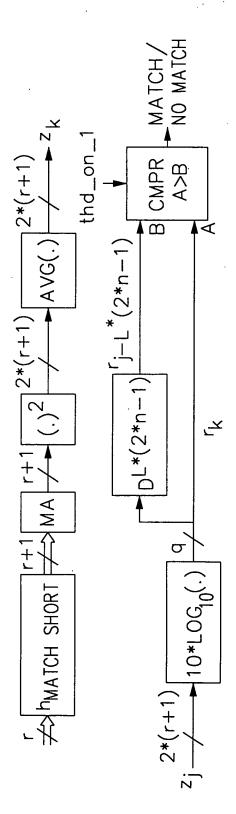
FIG.55a

FIELD	LENGTH	MEANING
DA	6 OCTETS	DESTINATION ADDRESS
SA	6 OCTETS	SOURCE ADDRESS
ETHERTYPE	2 OCTETS	0x886c (LINK CONTROL FRAME)
SSTYPE	1 OCTET	=5
SSLENGTH	1 OCTET	NUMBER OF ADDITIONAL OCTETS IN THE CONTROL HEADER, STARTING WITH THE SSVERSION FIELD AND ENDING WITH THE SECOND(LAST) OCTET OF THE NEXT ETHERYPE FIELD. SSLENGTH SHALL BE>= 6 FOR SSVERSION 0.
SSVERSION	1 OCTET	=0
VENDOR OUI	3 OCTETS	AN IEEE ASSIGNED ORGANIZATIONALLY UNIQUE IDENTIFIER
CONTROL DATA	0-249 OCTETS	VENDOR SPECIFIC CONTROL DATA
NEXT ETHERTYPE	2 OCTETS	= NEXT ETHERTYPE IF AN ENCAPSULATION FORMAT, OR 0 IF NO ENCAPSULATED FRAME
PAD	0-38 OCTETS	ANY VALUE OCTET
FCS	4 OCTETS	

FIG.55b

FIELD	LENGTH	MEANING
DA.	6 OCTETS	DESTINATION ADDRESS
SA	6 OCTETS	SOURCE ADDRESS
ETHERTYPE	2 OCTETS	0x886c (LINK CONTROL FRAME)
LSTYPE	2 OCTETS	=32769
LSLENGTH	2 OCTETS	NUMBER OF ADDITIONAL OCTETS STARTING WITH THE LSVERSION FIELD AND ENDING WITH THE SECOND(LAST) OCTET OF THE NEXT ETHERYPE FIELD. LSLENGTH SHALL BE>6 FOR LSVERSION O.
LSVERSION	1 OCTET	=0
VENDOR OUI	3 OCTETS	AN IEEE ASSIGNED ORGANIZATIONALLY UNIQUE IDENTIFIER
CONTROL DATA	1-65531 OCTETS	VENDOR SPECIFIC DATA
NEXT ETHERTYPE	2 OCTETS	= NEXT ETHERTYPE IF AN ENCAPSULATION FORMAT, OR 0 IF NO ENCAPSULATED FRAME
PAD	40-0 OCTETS	IF NEEDED TO MAKE MINIMUM SIZE FRAME. SHOULD BE ZERO.
FCS	4 OCTETS	·

CARRIER SENSE STATE	OUTPUT EVENTS
<u> </u>	ENERGY<=0. ONLY STARI-OF-PREAMBLE EVENTS CHECKED.
IDLE	ONLY START-OF-PREAMBLE EVENTS CHECKED.
BUSY	ONLY END-OF-PREAMBLE EVENTS CHECKED.
TRANSMIT	ONLY START-OF-PREAMBLE EVENTS CHECKED(COLLISION DETECTION)



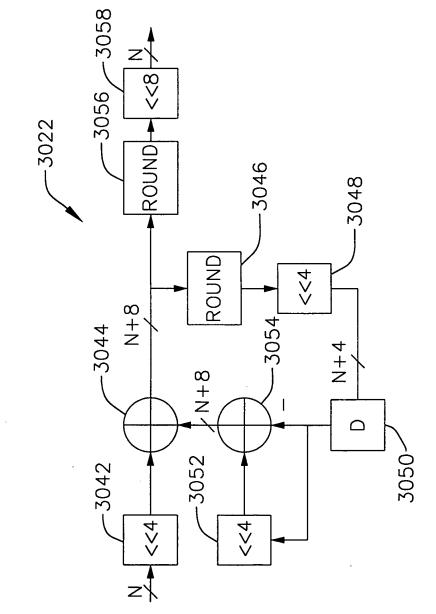
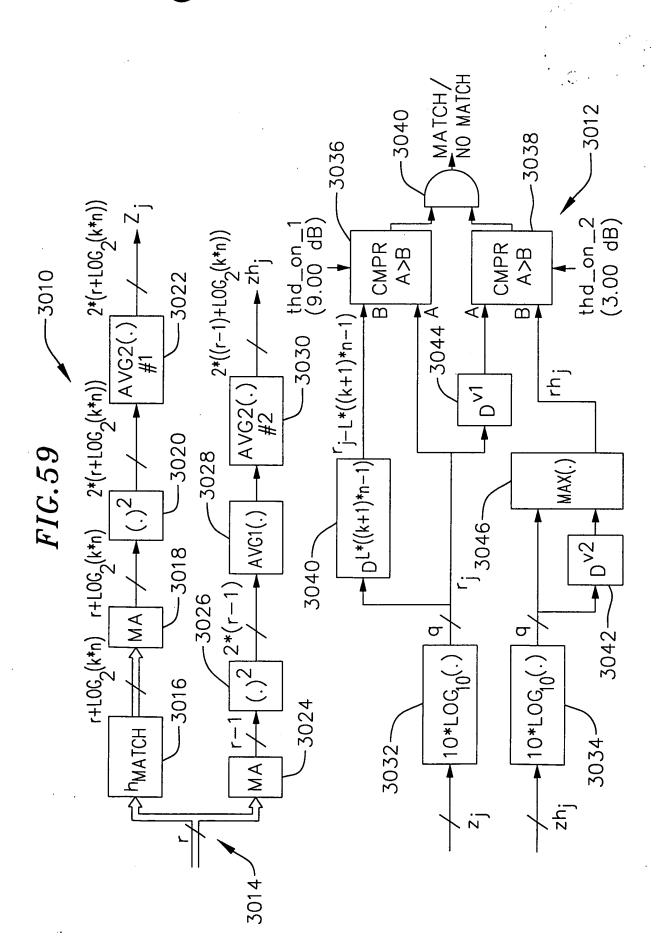


FIG.58



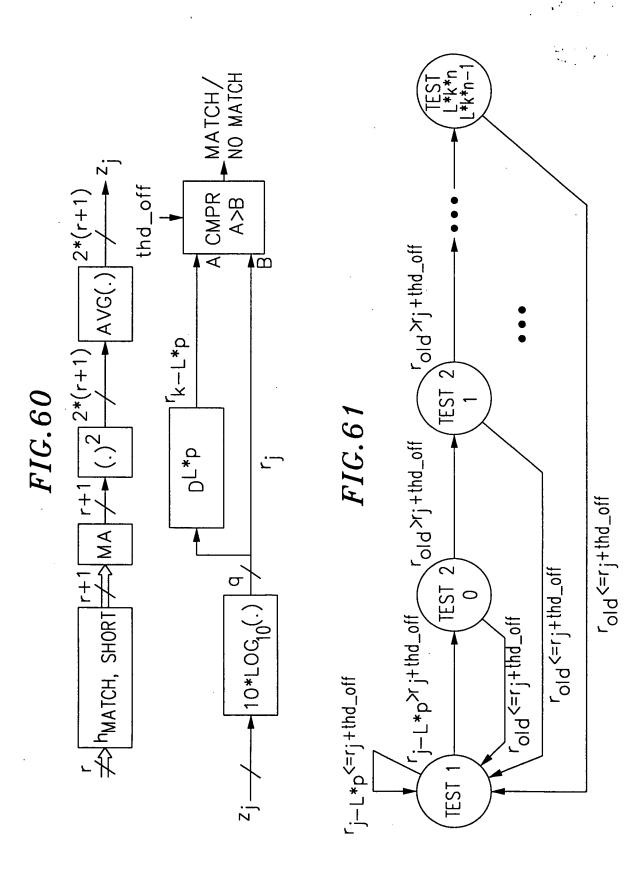


FIG. 62α

TABLE INDEX	TABLE VALUE
	(dB) 0.00 3.00
0	0.00
1	3.00
2	6.00
3	9.00
4	6.00 9.00 12.00
5	15.00 18.00
· 6	18.00
7	21.00
8	24.00
9	27.00
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	21.00 24.00 27.00 30.00 33.00 36.00 39.25 42.25 45.25
11	33.00
12	36.00
13	39.25
14	42.25
15	45.25
16	48.25 51.25 54.25 57.25 60.25 63.25 66.25 69.25
17	51.25
. 18	54.25
19	57.25
20	60.25
21	63.25
22	66.25
23	69.25
	72 25
25	75.25
26	78.25
27	81.25
28	84.25
29	87.25
25 26 27 28 29 30 31	90.25
31	75.25 75.25 78.25 81.25 84.25 87.25 90.25 93.25

FIG.62b

TABLE INDEX	TABLE VALUE
	(dB)
0	0.00
1	0.25
2	0.25
3	0.00 0.25 0.25 0.50
4	0.50
5	0.75
6	0.75
7	0.75
8	1.00
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	0.50 0.75 0.75 0.75 1.00 1.00 1.25 1.25 1.50 1.50 1.50 1.75
10	1.25
11	1.25
12	1.50
13	1.50
14	1.50
15	1.75
16	1.75
17	1.75
18	2.00
19	2.00
20	2.00
21	2.25
22	2.25
20 21 22 23	1.75 2.00 2.00 2.00 2.25 2.25 2.25 2.50
24	2.50
25	2.50
26	2.50
27	2.75
28	2.75
29	2.75
25 26 27 28 29 30 31	2.50 2.50 2.75 2.75 2.75 2.75 3.00
31	3.00

FIG. 63a

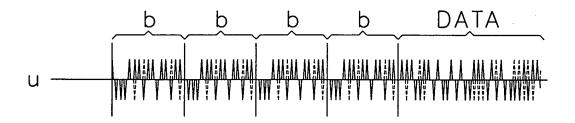
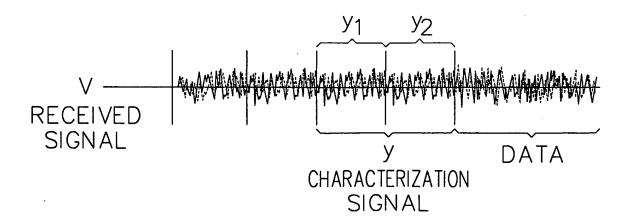
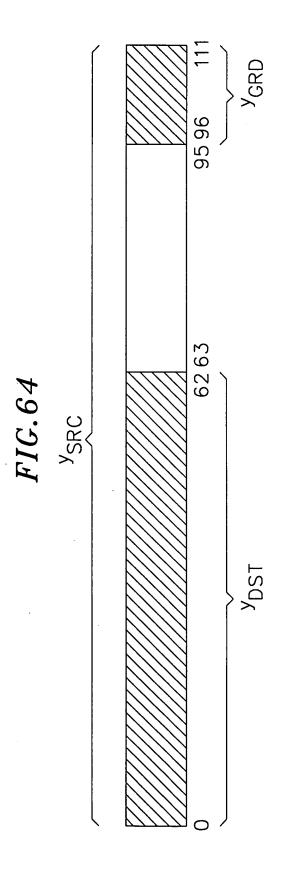


FIG.63b



FIG.63c





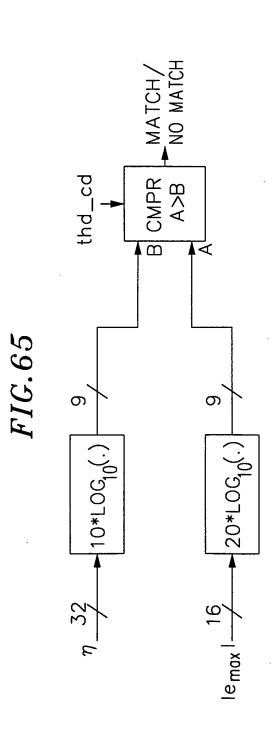


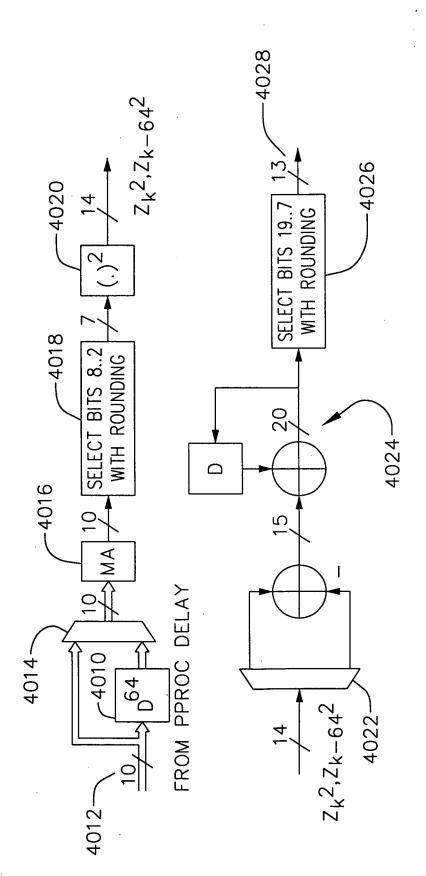
FIG. 66a

TABLE INDEX	TABLE VALUE
0	0.00
1	6.00
3	12.00
-3	18.00
4	24.00
5	30.00
6	36.00
7	42.25
8	48.25
9	54.25
10	60.25
11	66.25
12	72.25
13	78.25
14	84.25
15	90.25

FIG. 66b

TABLE INDEX	TABLE VALUE
0	0.00
1	0.50
2	1.00
3 4	1.50
	2.00
5	2.25
6	2.75
7	3.25
8	3.50
9	4.00
10	4.25
11	4.50
12	4.75
13	5.25
14	5.50
15	5.75

FIG.67



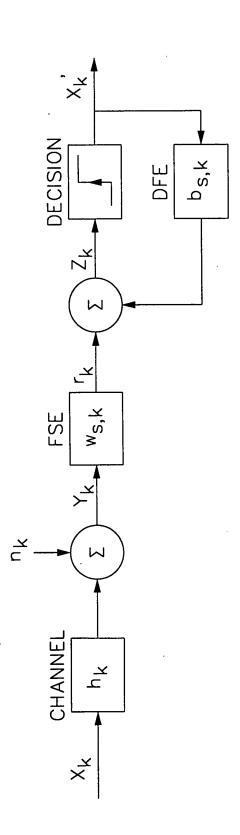
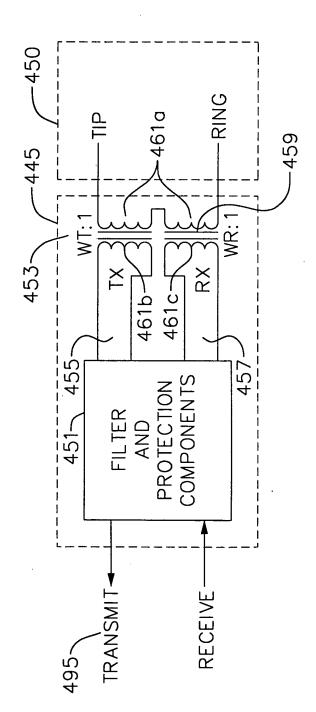
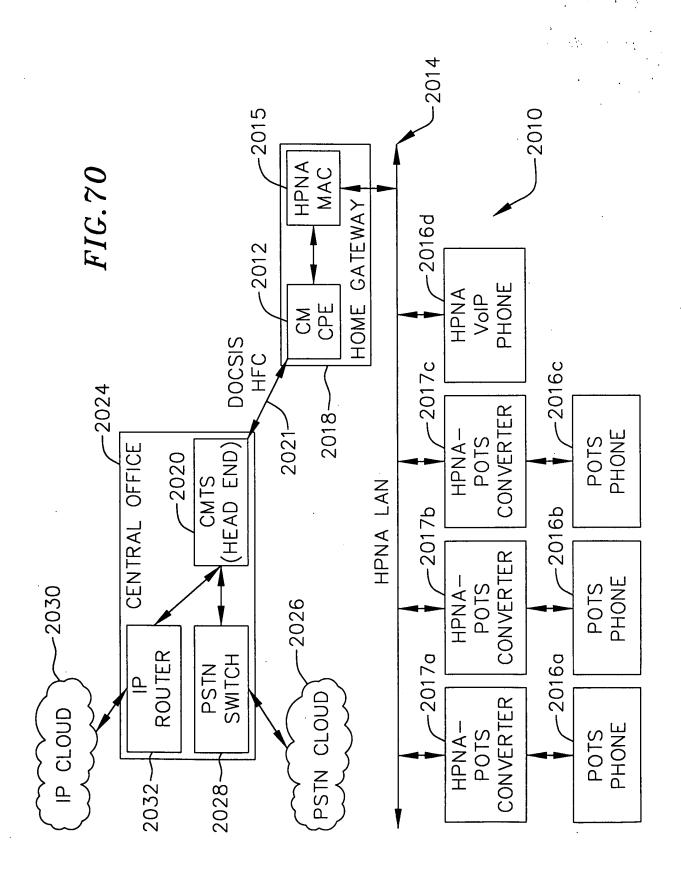
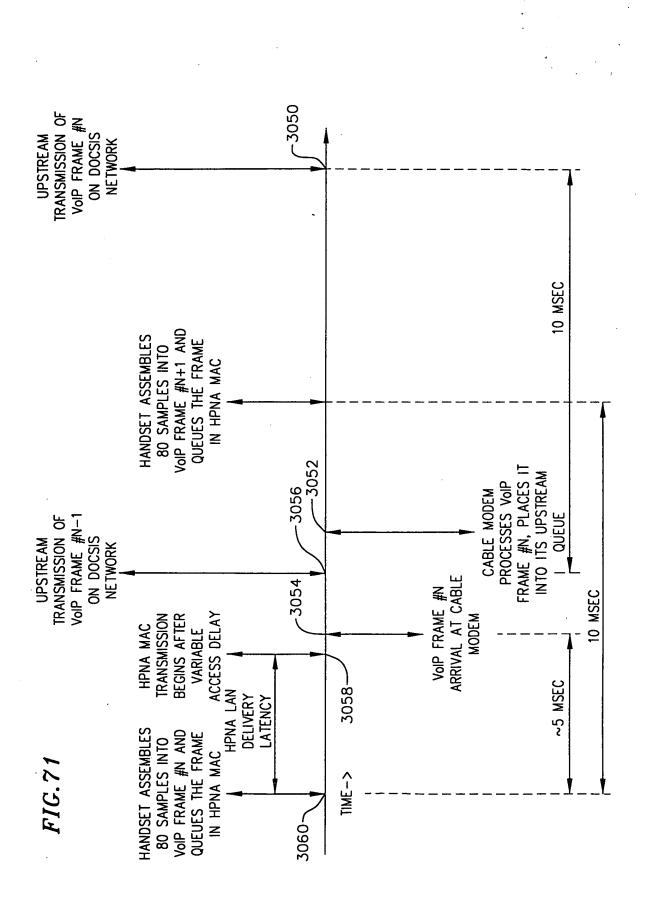


FIG.69







 $FIG.72\alpha$

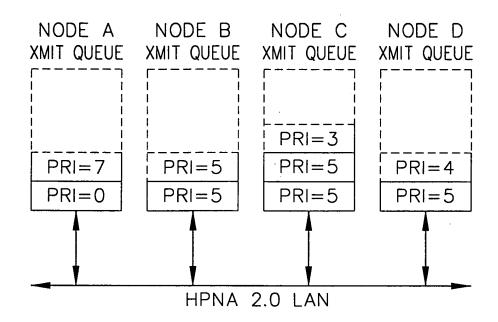


FIG. 72b

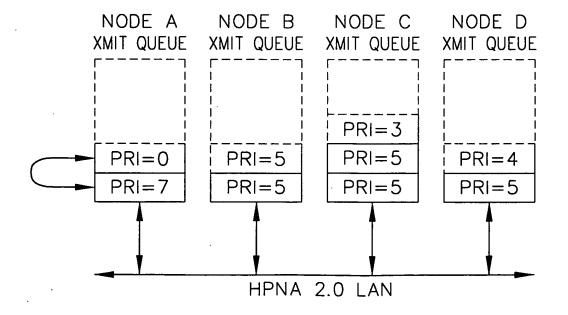


FIG. 73

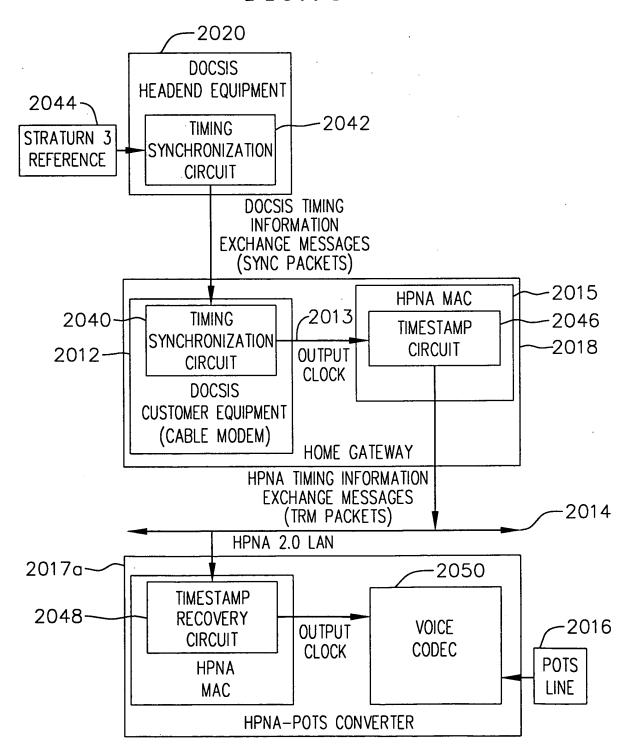


FIG. 74

	UPSTREAM			DOWNSTREAM			
	"10E-6	91%	90%	"10E-6	91%	90%	
PARAMTER	CASE	CASE	CASE	CASE	CASE	CASE	
ACCESS DELAY	3.1	1.3	1.3	3.1	1.3	1.3	
COLLISION RESOLUTION	2.7	2.7	0.8	2.7	2.7	0.8	
3 UP, 1 DOWN	2.1	1.0	1.0	2.1	1.0	1.0	
LAST UP	0.5	0.3	0.3	0.5	0.3	0.3	
COLLISION RESOLUTION	0.8	0.8	0.8	0.8	0.8	0.8	
3 UP, 1 DOWN	2.1	1.0	1.0	2.1	1.0	1.0	
LAST UP	0.5	0.3	0.3	0.5	0.3	0.3	
3 DOWN				1.5	0.8	0.8	
3 DOWN				1.5	0.8	0.8	
TOTAL LATENCY	11.8	7.4	5.5	14.9	8.9	7.1	

10E-6 CASE IS 10E-6 CRA ONCE OF TWO TRIES IN HOMES WITH MAXIMUM 4MBITS/SEC RAW RATE

91% CASE IS 10E-6 CRA ONCE OF TWO TRIES IN HOMES WITH MINIMUM 10MBITS/SEC RAW RATE

90% CASE IS 10E-1 CRA TWICE IN TWO TRIES IN HOMES WITH MINIMUM 10MBITS/SEC RAW RATE

VALUES IN THE TABLE ABOVE ARE IN MILLISECONDS.

OVERH	IEADS:			•	LINEAR	5	5	5
					PCM	NODES	NODES	NODES
IFG	PER	FRAME	LARQ	RTP_H	FRAME	CRA	CRA	CRA
	COLL	HDR	HDR	DR	SIZE	10E-6	10E-1	FIXED
0.018	0.206	0.07	8	40	160	13	4	2
MSEC	MSEC	MSEC	BYTES	BYTES	BYTES	COLLISIONS	COLLISIONS	COLLISIONS

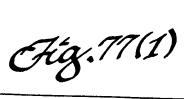
FRAME HEADER INCLUDES PREAMBLE, FC, DA, SA, T/L, EOF

FIG.75

	UPSTREAM			DOWNSTREAM			
	"10E-6	91%	90%	"10E-6	91%	90%	
PARAMTER	CASE	CASE	CASE	CASE	CASE	CASE	
ACCESS DELAY	3.1	1.3	1.3	3.1	1.3	1.3	
COLLISION RESOLUTION	0.4	0.4	0.4	0.4	0.4	0.4	
3 UP, 1 DOWN	1.4	0.8	0.8	1.4	0.8	0.8	
LAST UP	0.5	0.3	0.3	0.5	0.3	0.3	
COLLISION RESOLUTION	0.0	0.0	0.0	0.0	0.0	0.0	
3 UP, 1 DOWN	0.0	0.0	0.0	0.0	0.0	0.0	
LAST UP	0.0	0.0	0.0	0.0	0.0	0.0	
3 DOWN				1.1	0.6	0.6	
3 DOWN				0.0	0.0	0.0	
TOTAL LATENCY	5.5	2.7	2.7	6.5	3.3	3.3	

Fig. 76

<u>Field</u>	Length	Meaning
DA	6 octets	Destination Address
SA	6 octets	Source Address
Ethertype	2 octets	(TBD) = VOHN Link Control Frame - new IEEE assignment
Type	2 octets	1 = Timestamp Sync Message
Length	2 octets	= 4
Version	2 octets	= 0
SeqNum	2 octets	Timestamp Sync Message Sequence Number
Pad		Any value octet
FCS	4 octets	Frame Check Sequence



Field	<u>Lengt</u>	Meaning
DA	6 octet s	Destination Address
SA	6 octet s	Source Address
Ethertype	2 octet s	(TBD) = VOHN Link Control Frame - new IEEE assignment
Туре	2 octet s	2 = Timestamp Report Message
Length	2 octet s	Number of additional octets in the signaling frame, starting with Version field and ending with the last octet of the Data Payload field. Minimum is 2.
Version	2 octet s	= 0
TSMSeqNum	2 octet s	Sequence number of TSM to which the Timestamp in this message is applicable.
Timestamp	4 octet s	Timestamp of a previously transmitted Timestamp Report Message, corresponding to TSMSeqNum.
Frequency	2 octet s	Resolution of the timestamp and Gtimestamp fields, in ticks/1.000ms. For example, value 32768 corresponds to one clock tick at 32.768Mhz, in which the LSBit of the Timestamp corresponds to a time of 0.030517578125usec. The Timestamp will rollover every 131 seconds = 2.2 minutes
NumGrants	2 octet s	Number of Grant Timestamps specified in the payload of this control message. NumGrants may be zero. Each grant timestamp is accompanied by a Line ID and Call ID field. Including the Grant Timestamp, the total for each grant timestamp is 8 bytes.

Fig. 77(2)

		·
Line ID	2 octet s	Identifier of the Line termination associated with the immediately following GTimestamp.
Call ID	2 octet s	Identifier of the call instance on the Line termination associated with the immediately following GTimestamp.
GrantTimest amp	4 octet s	Grant Timestamp corresponding to the immediately preceding Line ID. This is the time at which the Proxy Gateway wishes to receive a future constant bit rate service flow packet in order to minimize delivery latency to subsequent delivery to a synchronous network. The time value corresponds to the time at the timing master. Additional packets for the identified service flow are expected to arrive at periodic intervals measured from this time.
•••		additional instances of {Line ID, Call ID, Grant Timestamp} field tuples
Pad		Any value octet
FCS	4 octet s	Frame Check Sequence

Ag. 78

PIN NAME	CM-side Function (HPNA timing master)		Handset Function (HPNA timing slave)	
DPLL_REF_CLK	DPLL input clock	IN		
Grant[4]	Grant Present Indication	IN		
Grant[3]	Grant SID Value[3]	IN		
Grant[2]	Grant SID Value[2]	IN		
Grant[1]	Grant SID Value[1]	IN		
Grant[0]	Grant SID Value[0]	IN		
V_CLK_OUT			DPLL output clock	OUT
GPI[0]			Grant Present Indication[0]	OUT
GPI[1]			Grant Present Indication[1]	OUT

Fig. 79

PIN NAME	CM-side Function (HPNA timing master)		Handset Function (HPNA timing slave)	
DPLL_REF_CLK	DPLL input clock	IN		
Grant[4]	Grant Present Indication	IN		
Grant[3]	Grant SID Value[3]	IN		
Grant[2]	Grant SID Value[2]	IN	·	
Grant[1]	Grant SID Value[1]	IN		
Grant[0]	Grant SID Value[0]	IN		
V_CLK_OUT			DPLL output clock	OUT
Frame[0]			Frame boundary marker[0]	OUT
Frame[1]			Frame boundary marker[1]	OUT

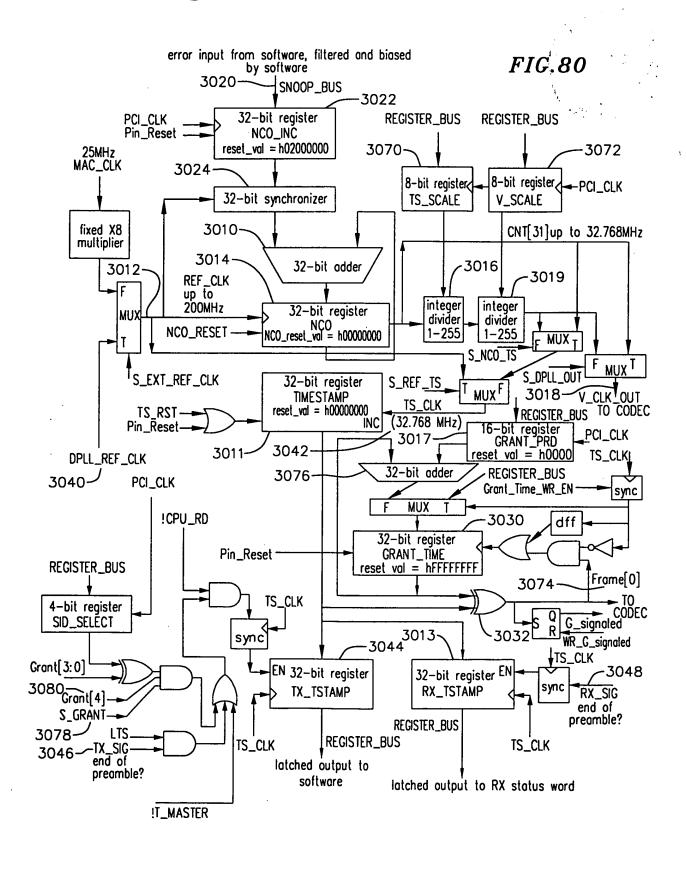
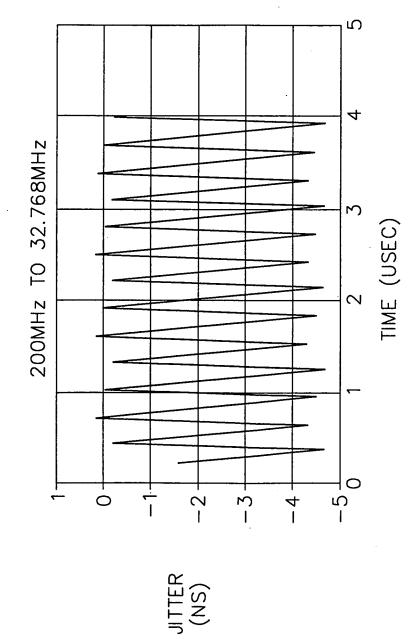
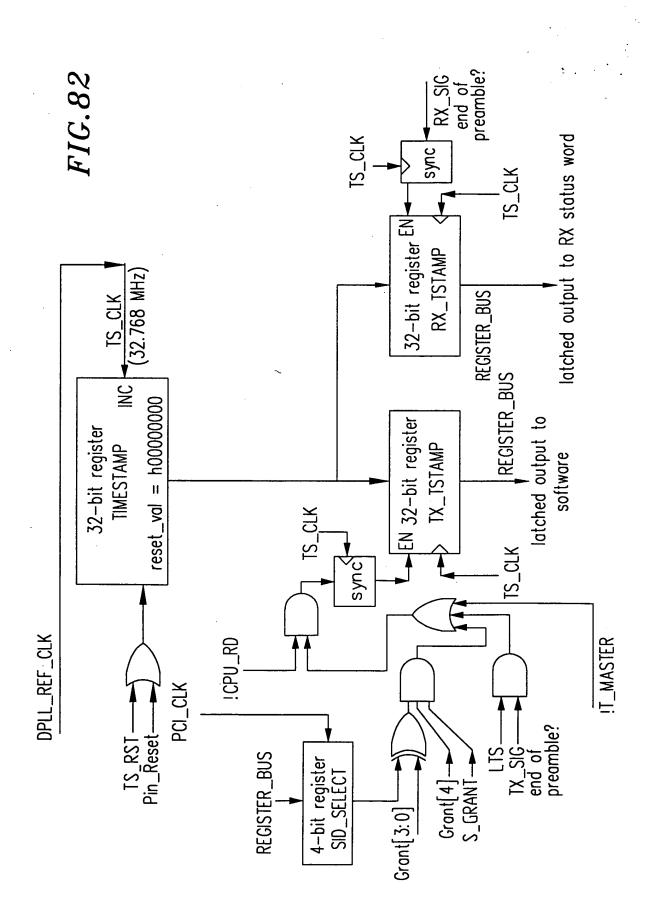


FIG.81



-OUTPUT TO REFERENCE JITTER



Ag.83a

PIN NAME	CM-side Function (HPNA timing master)		Handset Function (HPNA timing slave)
DPLL_REF_CLK	Timestamp input clock	IN	Timestamp input clock
Grant[4]	Grant Present Indication	IN	NA
Grant[3]	Grant SID Value[3]	IN	NA
Grant[2]	Grant SID Value[2]	IN	NA
Grant[1]	Grant SID Value[1]	IN	NA
Grant[0]	Grant SID Value[0]	IN	NA

Ag.836

Bit locations	Field name	Description
7-3	Reserved	
2	TsReset	When set to 1, forces timestamp register to value of 0x00000000. When set to 0, allows timestamp register to increment by one for each detected DPLL_REF_CLK rising edge.
1	SGrant	When set to 1, causes timestamp to be latched into txTimeStampHigh and txTimeStampLow registers whenever the value of tscSID matches the value of input pins Grant[3:0] and Grant[4] is asserted. When set to 0, disables txTimeStampHigh and txTimeStampLow latching under the stated conditions.
0	TMaster	When set to 1, enables txTimestampHigh and txTimestampLow registers to be latched with timestamp values at times determined by frame transmissions (through the LTS descriptor bit) or grant events (through the sGrant descriptor bit). When set to 0, enables txTimestampHigh and txTimestampLow registers to be latched with timestamp values at times determined by txTimeStampHigh and txTimeStampLow register read accesses.

Default value of this register is 0x05

Bit locations	Field name	Description
7-4	Reserved	
3-0	SID .	SID value that is to be matched by Grant[3:0] pins in order to cause a grant timestamp value to be latched. When the Grant[3:0] pins match the SID value and the Grant[4] input is 1 and the sGrant register bit is 1, then the current timestamp value will be latched into the txTimeStampHigh and txTimeStampLow registers.

Default value of this register is 0x00 Gg.83C

Ag.83d

Bit locations	Field name	Description
15-0	txTimeStampL ow	Least significant 16 bits of the latched tx timestamp value

Default value of this register is undefined.

Fig.83e

Bit locations	Field name	Description
		Most significant 16 bits of the latched tx timestamp value

Default value of this register is undefined.

Fig.83f

Bit locations	Field name	Description	
15-0	rxTimeStampL ow	Least significant 16 bits of the latched rx timestamp value	

Default value of this register is undefined.

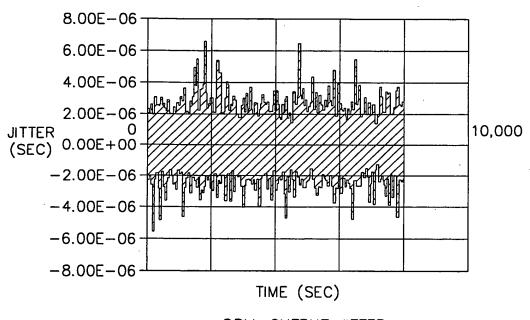
Fig 839

Bit locations	Field name	Description
15-0		Most significant 16 bits of the latched rx timestamp value

Default value of this register is undefined.

FIG.84a

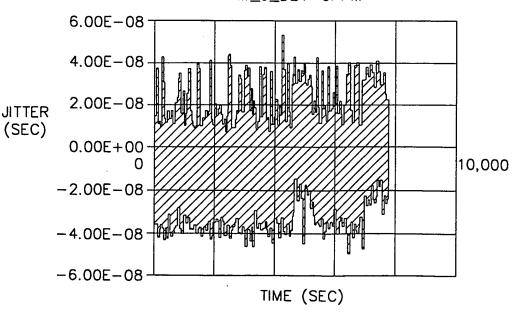
DPLL OUTPUT JITTER
TS=24.576MHz, TRM=1.0SEC, LG=0.9, IG=0.1, TG00D=0.95,
M_J_DEV=1PPM



---- DPLL OUTPUT JITTER

FIG.84b

DPLL OUTPUT JITTER
TS=24.576MHz, TRM=1.0SEC, LG=0.9, IG=0.1, TG00D=0.95,
M_J_DEV=0PPM



----- DPLL OUTPUT JITTER

Ag. 85 (1)

<u>Field</u>	<u>Length</u>	Meaning	
DA	6 octets	Destination Address (FF.FF.FF.FF.FF)	
SA	6 octets	Source Address	
Ethertype	2 octets	0x886c (HPNA Link Control Frame)	
SSType	1 octet	= TBD	
SSLength	1 octet	Number of additional octets in the control header, starting with the SSVersion field and ending with the second (last) octet of the Next Ethertype field. Minimum is 16.	
SSVersion	1 octet	= 0	
TRM_type	1 octet	Value of x00 means that this is a TRM containing a valid timestamp. Value of x01 means that the master does not have a valid clock and slaves should give local indication that they are no longer locked to a master reference. Value of x80 means that this is a TQM. Value of x81 means that this is a TSM. All other values are reserved.	
TRMSeqNum	2 octets	Timestamp Report Message Sequence Number for this message. Sequence number of x0000 indicates an initial TRM, implying that Timestamp and PrevTRMSeqNum are both invalid.	
PrevTRMSeqNu m	2 octets	Sequence number of TRM to which the Timestamp in this message is applicable. The value of PrevTRMSeqNum is not necessarily equal to TRMSeqNum minus one. PrevTRMSeqNum is set to x0000 for the first TRM of a TRM pair.	

Ag. 85(2)

	I		
Field	<u>Length</u>	Meaning	
Timestamp	4 octets	Timestamp of a previously transmitted Timestamp Report Message, corresponding to PrevTRMSeqNum. The LSBit of the Timestamp corresponds to a time of $0.030517578125\mu \text{sec} = \text{one clock tick at } 32.768\text{MHz}$. The Timestamp will rollove every 131 seconds = 2.2 minutes.	
NumSlots	1 octet	Number of Slot Timestamps specified in the payload of this control message. NumSlots may be zero. Each Slot Timestamp is accompanied by a MACAddr, and Channel_ID field. Including the Slot Timestamp, each Slot Timestamp is 12 bytes long.	
PAD_0	3 octets	Padding to align to a 32-bit boundary. Always present, even when NumSlots has the value of 0.	
MACAddr	6 octets	MAC Address associated with the immediately following Channel_ID and STimestamp.	
Channel_ID	2 octets	Identifier for a channel associated with the immediately preceding MACAddr.	
STimestamp	4 octets	Slot Timestamp corresponding to the immediately preceding Channel_ID. This is the time at which the TRM sender wishes to receive a future constant bit rate service flow packet in order to minimize overall latency of delivery to a synchronous network. The time value corresponds to the time at the timing master. Additional packets for the identified service flow are expected to arrive at periodic intervals measured from this time. The LSBit of the STimestamp corresponds to a time of $0.030517578125\mu sec = one clock tick at 32.768MHz$.	
MACAddr	6 octets	MAC Address associated with the immediately following Channel-ID and STimestamp.	
Channel_ID	2 octets	Identifier for a channel associated with the immediately following Channel_ID and STimestamp.	

Fig. 85(3)

[<u> </u>	
Field	<u>Length</u>	Meaning
STimestamp	4 octets	Slot Timestamp corresponding to the immediately preceding Channel_ID. This is the time at which the TRM sender wishes to receive a future constant bit rate service flow packet in order to minimize overall latency of delivery to a synchronous network. Additional packets for the identified service flow are expected to arrive at periodic intervals measured from this time. The LSBit of the STimestamp corresponds to a time of $0.030517578125\mu sec = one$ clock tick at 32.768 MHz.
•••		[additional instances of MACAddr, Channel_ID and Gtimestamp fields, until the number of Gtimestamp fields equals NumGrants]
Next Ethertype	2 octets	= 0
Pad	max (0,44- SSLengt h octets	Any value octet
FCS	4 octets	

Fig. 86

	T		
Field	Length	<u>Meaning</u>	
DA	6 octets	Destination Address (FF.FF.FF.FF.FF)	
SA	6 octets	Source Address	
Ethertype	2 octets	0x886c (HPNA Link Control Frame)	
SSType	1 octet	= 6	
SSLength	1 octet	Number of additional octets in the control header, starting with the SSVersion field and ending with the second (last) octet of the Next Ethertype field. Minimum is 4.	
SSVersion	1 octet	= 0	
TRM_type	1 octet	Value of x80 means that this is a TQM.	
Next Ethertype	2 octets	= 0	
Pad	MIN(0,4 0- SSLengt h) octets	Any value octet	
FCS	4 octets		

Ag. 87

Field	Length	<u>Meaning</u>	
DA	6 octets	Destination Address (FF.FF.FF.FF.FF)	
SA	6 octets	Source Address	
Ethertype	2 octets	0x886c (HPNA Link Control Frame)	
SSType	1 octet	= 6	
SSLength	1 octet	Number of additional octets in the control header, starting with the SSVersion field and ending with the second (last) octet of the Next Ethertype field. Minimum is 4.	
SSVersion	1 octet	= 0	
TRM_type	1 octet	Value of x81 means that this is a TSM.	
Next Ethertype	2 octets	= 0	
Pad	MIN(0,4 0- SSLengt h) octets	Any value octet	
FCS	4 octets		

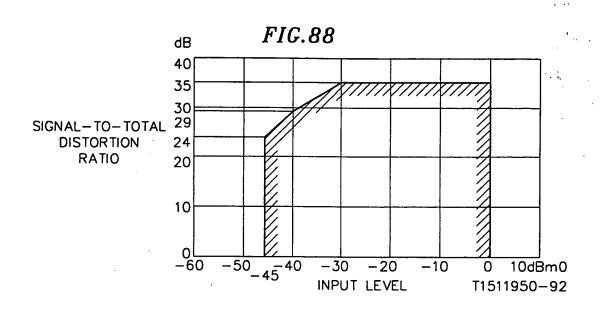


FIG.89a

INPUT LEVEL	UNIFORM QUANTIZER + COMPANDER SNR		THE REQUIRED SNR FOR ADC/DAC
0dBm	38.43dB	60dB	
-30dBm	35.50dB	54dB	
-40dBm	30.09dB	44dB	

FIG.89b

INPUT LEVEL	G.712 SNR SPEC	THE TOTAL SNR WITH UNIFORM QUANTIZER+COMPANDER+JITTER CLOCK
0dBm	35dB	38.32dB (60dB ADC/DAC SNR IS USED)
-30dBm	35dB	35.42dB (54dB ADC/DAC SNR IS USED)
-40dBm	29dB	30.05dB (44dB ADC/DAC SNR IS USED)

FIG.89c

INPUT LEVEL	G.712 SNR SPEC	THE TOTAL SNR WITH UNIFORM QUANTIZER+COMPANDER+JITTER CLOCK
0dBm	35dB	38.38dB (60dB ADC/DAC SNR IS USED)
-30dBm	35dB	35.26dB (54dB ADC/DAC SNR IS USED)
-40dBm	29dB	30.03dB (44dB ADC/DAC SNR IS USED)

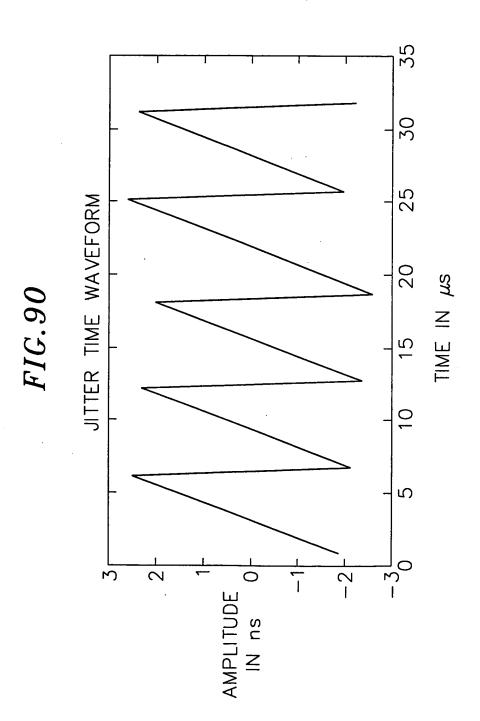
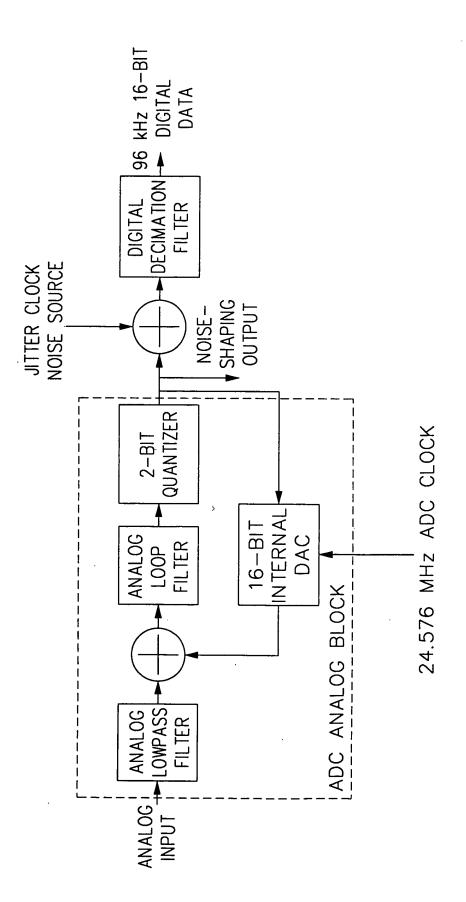


FIG.91





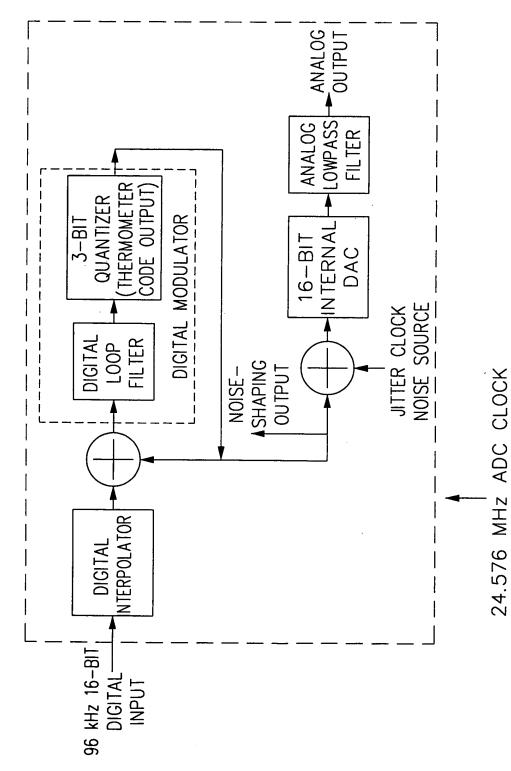
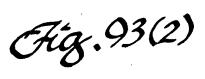


Fig. 93(1)

Octet	Field	Lengt h	Description
Flags 0	TxPriority7	1	Station is (was) transmitting frames with LL priority 7. (always set)
	TxPriority6	1	Station is (was) transmitting frames with LL priority 6.
	TxPriority5	1	Station is (was) transmitting frames with LL priority 5.
	TXPriority4	1	Station is (was) transmitting frames with LL priority 4.
	TxPriority3	1	Station is (was) transmitting frames with LL priority 3.
	TxPriority2	1	Station is (was) transmitting frames with LL priority 2.
	TxPriority1	1	Station is (was) transmitting frames with LL priority 1.
	TxPriority0	1	Station is (was) transmitting frames with LL priority 0. (always set)
Flags 1	Reserved	5	Shall be sent as 0 and ignored by 2.0 stations when received.
	CSS_Master_Capab ility	1	This station is capable of operating as a CSS Master node.
	No_V1M2_Frames	1	This station does not support the reception or transmission of compatibility frames (V1M2 frames).
	Supports 4Mbaud	1	This station supports 4 megabaud payload encodings.
Flags 2	Reserved	8	Shall be sent as 0 and ignored by 2.0 stations when received.
Flags 3	ConfigV2	1	Force use of 10M8 mode, defers to Configl and ConfigVlMs.
	ConfigV1M2	1	Force use of HPNA V1M2 mixed mode, defers to ConfigV1.



Octet	Field	Lengt h	Description
	ConfigVl	1	Force use of HPNA 1.x mode, highest precedence of config flags.
	Reserved	2	Shall be sent as 0 and ignored by 2.0 stations when received.
	Highest Version	3	This station's highest supported HPNA version: 0x000 Reserved 0x001 HPNA 1.0 0x010 HPNA 2.0 0x001-0x111 Reserved



Field	<u>Lengt</u> <u>h</u>	Meaning
CSEType	1 octet	X00 = signifies a CSS Extension type
CSELength	1 octet	X08 = Number of additional octets in this CSEType. CSELength is always x08 for CSEType = x00 = CSS
CSS_MAC	6 octet s	MAC address of client station
CSS_SEQ	2 octet s	CSS sequence, 8 two-bit values concatenated: 0-2 indicate a specific signaling slot, while 3 indicates the use of a randomly selected value chosen by the client at the time of the collision. X0000 - xBFFF = assigned CSS SEQ value for the node possessing the MAC address specified in CSS MAC XC000 - xFEFF = reserved XFF00 = indication by the client node specified by CSS MAC that it is no longer an active sender of link layer priority 6 frames (equivalent to a "0 active channels" indication) XFF01 - xFFFE = request by the client node specified by CSS MAC for a CSS Sequence from the master node. The 8 Least significant bits indicate the number of active channels which are sending link layer. priority 6 frames for this client. XFFFF - reserved



2-bit CSS register value (binary)	Signal slot integer (decimal)
00	0
01	1
10	2
11	Random in range [0,2]

Bit Number	Value
7:0	Station Type:
-	0 – HomePNA 1.x station
	1 – 10M8 station in V1M2 Mode
	2 – 10M8 station in V1M2 Mode, that has detected a recent 1M8 transmission with
	PCOM Station Type = 0
	Other values reserved
31:8	Reserved, must be 0 on transmission

Hg.96

Precedence	Variable
1	ConfigV1
2	ConfigV1M2
3	ConfigV2
4	VI_DETECTED
4	VI_SIGNALED

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